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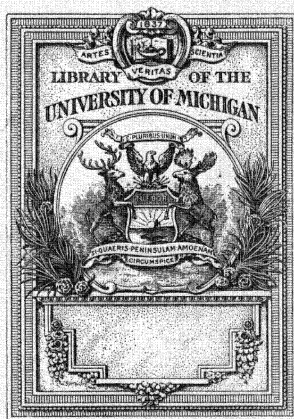
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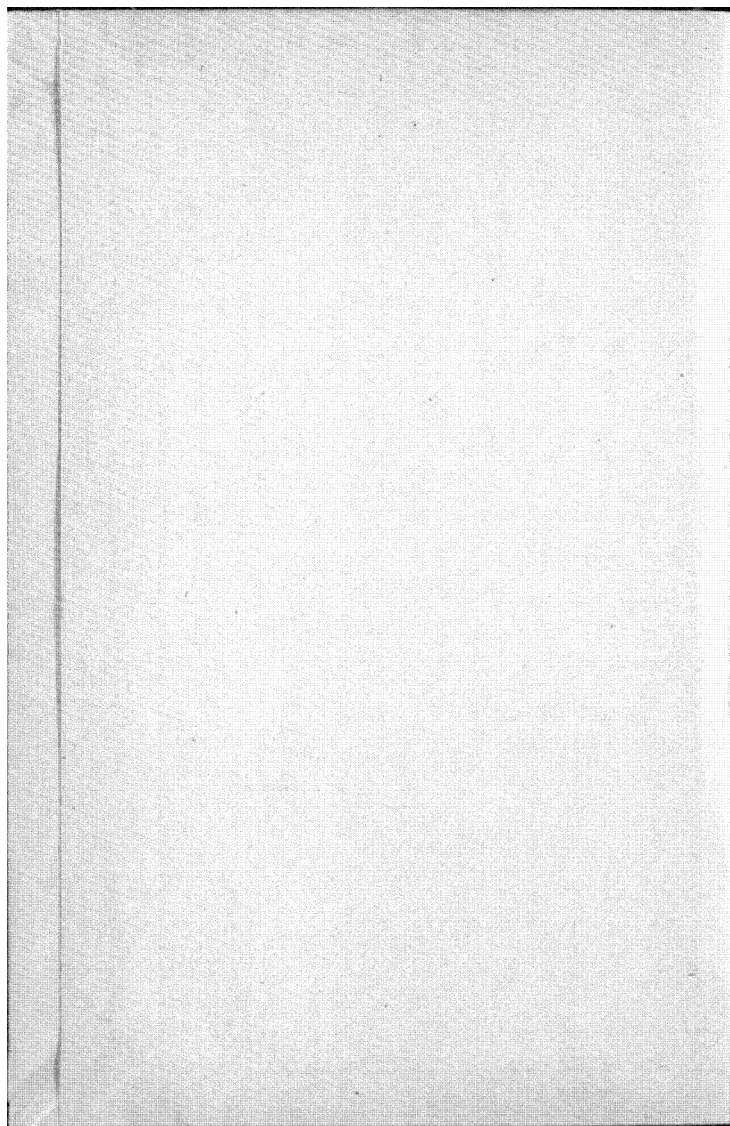
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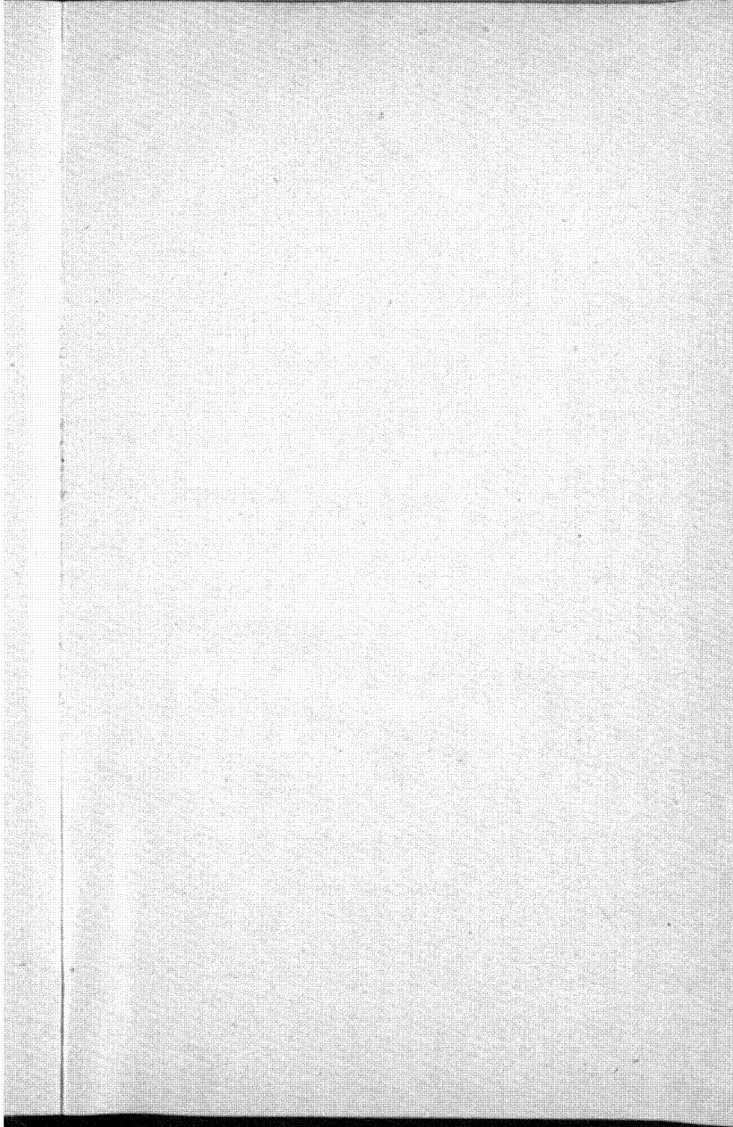




THE GIFT OF  
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LOUISIANA PURCHASE EXPOSITION,

ST. LOUIS, MO., U. S. A., 1904.

*May 27 04*

# OFFICIAL HANDBOOK OF THE PHILIPPINES

AND



CATALOGUE OF THE PHILIPPINE EXHIBIT.

IN TWO VOLUMES.

PART I.

PUBLISHED UNDER AUTHORITY OF THE CIVIL GOVERNOR OF THE PHILIPPINE ISLANDS  
BY THE PHILIPPINE EXPOSITION BOARD.

*Revised and corrected*

WILLIAM P. WILSON, *President.*

GUSTAVO NIEDERLEIN, *Member.*

PEDRO A. PATERNO, *Member.*

LEÓN M. GUERRERO, *Secretary.*

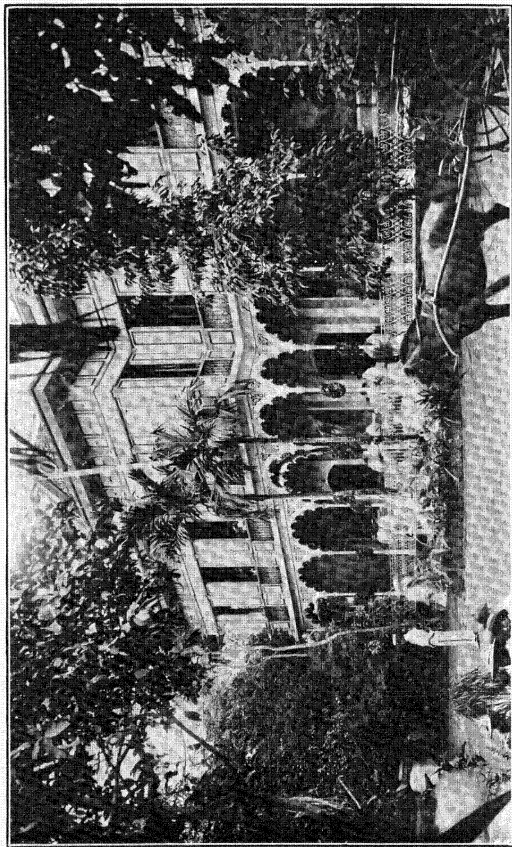
MANILA:

BUREAU OF PUBLIC PRINTING.  
1903.









OFFICE AND MUSEUM OF THE PHILIPPINE EXPOSITION BOARD IN MANILA, P. I.

# OFFICIAL HANDBOOK.

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## DESCRIPTION OF THE PHILIPPINES.

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### PART I.

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COMPILED IN THE  
BUREAU OF INSULAR AFFAIRS, WAR DEPARTMENT,  
WASHINGTON, D. C.

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REVISED AND COMPLETED WITH THE AID OF CHIEFS OF BUREAUS AND  
EXPERTS OF THE PHILIPPINE GOVERNMENT.

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MANILA:  
BUREAU OF PUBLIC PRINTING.  
1903.



## LETTER OF TRANSMITTAL.

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WAR DEPARTMENT, BUREAU OF INSULAR AFFAIRS,

*Washington, D. C., June 17, 1903.*

SIR: I have the honor to transmit herewith a description of the Philippine Islands prepared in this Bureau by the compilation division, of which Mr. Beall is chief, in compliance with your request contained in your letter of January 5, 1903, addressed to the chief of the compilation division.

Very respectfully,

CLARENCE R. EDWARDS,

*Colonel, United States Army, Chief of Bureau.*

Dr. GUSTAVO NIEDERLEIN,

*Member in Charge of Exposition Board, Manila, P. I.*

(Through the Civil Governor.)

---

OFFICE OF THE CIVIL GOVERNOR,

*Manila, P. I., August 28, 1903.*

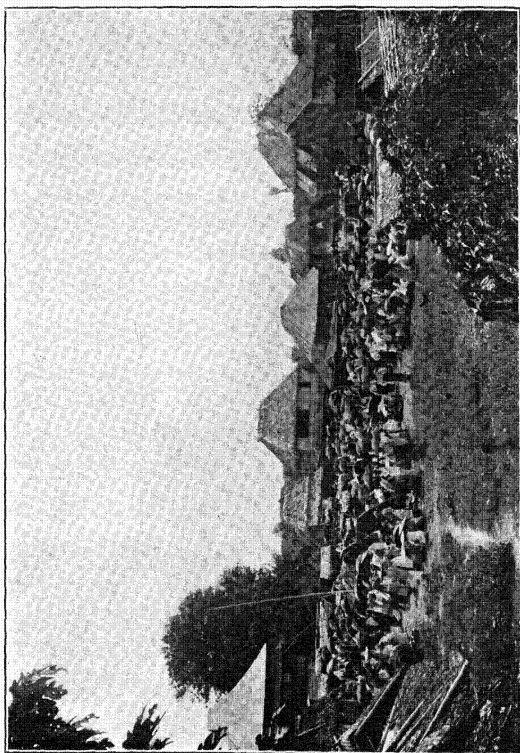
Respectfully returned to Dr. Niederlein, approving the publication of the description of the Philippine Islands as requested.

WM. H. TAFT,

*Civil Governor.*







MARKET PLACE IN TARLAC.

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## BRIEF CHRONOLOGICAL SKETCH OF THE ORGANIZATION OF THE PHILIPPINE EXPOSITION BOARD AND THE COLLECTION AND INSTALLATION OF THE PHILIPPINE EXHIBIT.

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After a conference in the spring of 1902, President Roosevelt, Secretary Root, and Governor Taft decided that the Government of the Philippine Islands should devote at least \$250,000 to the preparation of a thoroughly creditable exhibit for the World's Fair at St. Louis. Anxious to secure a decided success, Governor Taft, before returning to the Islands, endeavored to increase this amount by soliciting assistance from the Louisiana Purchase Exposition, which was quite as interested as was the Insular Government in making the Philippine Exhibit a special feature of the Fair. He succeeded in having promised to him an allotment of \$100,000. The Philippine Commission soon after passed the following resolution:

The question of the amount to be appropriated by the Philippine Government for exposition purposes at the World's Fair in St. Louis in nineteen hundred and four having been raised by the President [of the Commission] and the matter having been discussed at some length by the Commission, it was agreed that at least two hundred and fifty thousand dollars, in money of the United States, should be appropriated, and the President was directed to cable this fact to the United States together with a request for a competent man to come to the Islands to prepare such an exhibit with the promise on the part of the Commission of a further appropriation should the conditions upon investigation seem to demand an increase.

At about that time Hon. John Barrett, commissioner-general to Asia and Australia for the St. Louis World's Fair, came to these Islands to interest Filipinos and Americans in a comprehensive participation by the Philippine Archipelago. In one of his speeches he illustrated characteristically the responsibility of the World's Fair expert called to assist the Insular Government in making a creditable showing, saying:

There is soon coming out from America in the person of Dr. Niederlein, connected with the Philadelphia Museums, a competent expert who will take general charge of the Philippine participation; who was selected only after careful consideration of the available men, and I believe he will meet your expectations. With him will be associated one or more representative Filipinos, but to make sure that the exhibits from the Archipelago represent all interests, I would urge upon you, business men, to select from your number a committee to coöperate with the Government commission; let these men be those who will be unselfish and who will work for the general good of the business community and not for their individual interests. A great deal will depend upon that characteristic.

Professor Lyon expressed himself in similar terms.

Mr. Niederlein, chief of the scientific department of the Philadelphia Museums, former commissioner of the Argentine Government for the Paris, Chicago, and Atlanta expositions, vice-president for the French Colonial Exhibition at the Pan-American Exposition at Buffalo, member in charge of the United States Commercial Commission to China in 1898 and 1899, etc., and who shortly before (1900-1902) had re-established the French Colonial Museum (now called "Musée Commercial de l'Office Colonial du Ministère des Colonies," in the Palais Royal, Paris), was called by cable August 29 to take charge of the collecting and classifying of the Philippine exhibit. On his arrival in Manila he presented a plan to the Philippine Civil Commission; he also proposed the establishment of a museum and the holding of a preliminary exposition, the founding of a Philippine Academy or Institute of Science, Art, Commerce, and Industry, with the object of uniting prominent professional men, Government officials, teachers, priests, economists, men of science and art, men prominent in business and trade, agriculture, and mining, for coöperation in making a full exploration of the Philippine Islands and collaboration for a brilliant Philippine display of the resources and economic and social conditions of the Archipelago. The necessary instructions and information for collecting, preparing, and shipping the expected exhibits having been prepared by him, November 8 Governor Taft issued a circular letter to the Bureaus of the Insular Government and all provincial and municipal officers in the Philippine Islands, requesting them to assist in every possible way in making the exhibit a success. Act No. 514, creating "a commission to secure, organize, and make an exhibit of Philippine products, manufactures, art, ethnology, and education at the Louisiana Purchase Exposition," November 11, 1902, set aside \$250,000, United States currency, for that purpose. Two days later Gustavo Niederlein and Pedro A. Paterno were appointed members of the Exposition Board, with Mr. Leon M. Guerrero as secretary. November 17 Mr. George P. Linden, Mr. A. E. Escamilla, and Miss E. R. Ross were appointed curator, interpreter and assistant secretary, and stenographer, respectively. Instructions, information, and classifications in Spanish and the Tagalog, Visayan, Ilocano, Vicol, Pampanga, and Pangasinan dialects were published. Up to date 51,500 of such pamphlets have been printed and distributed. The Exposition Board then circulated letters to the number of 116,000, of which 13,000 were in English, 98,500 in Spanish, and 5,000 in Tagalog, among proper persons and organizations, and every prominent firm in the directory. Posters in English, Spanish, Tagalog, Visayan, Vicol, Ilocano, Pampanga, and Pangasinan, 20,000 in all, setting forth the purposes of the exposition and the wishes of the Exposition Board, were distributed among numerous committees gradually appointed throughout the Archipelago. These posters were made in imitation of World's Fair posters,

having upon them the pictures of Presidents McKinley and Roosevelt, and Jefferson, Napoleon, Rizal, and Governor Taft. The same design was applied to 30,000 Diplomas of Grateful Recognition, worded as follows:

The Philippine Exposition Board for the St. Louis Universal Exposition of 1904 has the honor to award this diploma of grateful recognition to ———— for the receipt of his valuable contribution to the Louisiana Purchase Exposition of 1904, the preliminary exposition to be held in Manila in 1903, the Permanent Museum of Philippine Products in the capital of these Islands, and to tender its thanks to him for the aid thus rendered in promoting the object of the Philippine Government for the welfare and progress of these Islands.

Manila, ———, ———, ———.

Dr. William P. Wilson, director of the Philadelphia Commercial Museums, and Mr. Carson Taylor were appointed chairman of the Exposition Board and disbursing officer, respectively, at about this time. The Board held its sessions in the Ayuntamiento, where its members came into close contact with the members of the Civil Commission, heads of Bureaus interested in the exposition work, and the provincial governors who were then in Manila to be instructed in census work under the direction of Gen. J. P. Sanger.

The Exposition Board states with pleasure that it owes much of its success to the exceptionally disinterested collaboration of many provincial governors and municipal committees. By this exposition work the Filipino people have given a proof of their patriotic pride, which has induced them to make a great effort in order that the resources and conditions of their country may appear in a dignified manner before the civilized world. While in the Ayuntamiento all necessary preparations for successful work were made, but the positive work began when the Board moved, January, 1903, to its present premises, Calle General Solano, No. 384, San Miguel. In order to give an idea of the Board's correspondence and general propaganda work it may be stated that, outside of the enumerated pamphlets and circulars, 50,000 letter heads and 15,000 second sheets, 111,600 envelopes, over 102,000 cards, and 18,000 printed labels were used. The employees of the Exposition Board have worked hard and are entitled to high praise for the work done throughout the year without interruption.

A number of committees were called into life, and the system of contracts and of sending out of special collectors adopted. The first contracts were made with Government Departments, particularly with Bureaus of the Department of the Interior, and large credits were opened to the same for important collections to be handed over to the Exposition Board in a given time. Mr. Albert P. Wright, Mr. John S. Gillies, and Mr. Valentine Wilson were engaged as collectors to go into the provinces, obtain proper exhibits, and instruct the people and the committees how to aid the Board in its endeavors to secure a worthy exhibit of the resources of the Philippine Islands.

The collecting of exhibits was made as easy as possible by exempting exhibitors from taxes on exhibits; by free postage on packages up to 4 pounds; free telegraph privileges, and free transportation on United States Army transports and Coast Guard vessels. Foreign shipping firms and the Manila-Dagupan Railway gave free transportation to exposition materials.

At the beginning the Board failed in many endeavors, notwithstanding the hearty support given by the American, Filipino, and Spanish press.

The best results were obtained in the provinces, due principally to the governors, who, as before stated, had assembled in Manila and were made acquainted with the Exposition work in the address of welcome by Governor Taft at the official reception in the Ayuntamiento December 15, through the speech of Mr. Niederlein, and afterwards, on December 19, in the office of the Exposition Board, where special instructions and a mass of literature were given to them. Circular letters were sent to nearly every educated man in Manila and in the provinces, including prominent Government employees in the different Bureaus, teachers, postmasters, telegraph operators, Constabulary officers, and officers of the Army.

At the beginning of December the coöperation of all officers of the Army was requested, through the War Department, in making the war exhibit one which should fully illustrate the achievements of the United States Army in the Philippines in military as well as administrative capacities.

After the provincial committees had been formed nearly 50,000 circulars, together with other printed matter, were distributed to them, to the justices of the peace, and to other municipal officers.

The Board, however, soon found out that its best reliance for the success of a Philippine Islands exhibit would be unlimited funds to be used at the last moment when no more gratuitous contributions could be expected. On December 4 President Francis, of the Louisiana Purchase Exposition, granted a request to transfer to the Philippine Exposition Board all the royalties for concessions on the site of the Philippine exhibit in St. Louis, which meant an estimated increase of about \$100,000 in funds.

The Board suggested to the Exposition Company the investment of the \$100,000 allotted by it in the erection of the buildings and in the preparation of the grounds at St. Louis, to be superintended by the chairman of the Board, Dr. Wilson. It also suggested the establishment of a public museum, and with the hope of making such a museum more attractive and useful, it invited, through the Philadelphia Commercial Museum, American manufacturers to participate in its establishment by sending out agricultural implements and other goods suitable to the Islands. Preliminary provincial expositions in the capital of each province were suggested to the provincial governors. The influence of the press, of organizations and individuals, and of the apostolic delegate was

solicited. The interest of manufacturers was incited by demonstrating to them the benefits that could be derived from town or city expositions and inviting them to exhibit their cigars, cigarettes, artistic furniture, gold and silver ware, products of art and of domestic industries, etc., in the permanent museum. Finally the Board proposed to give the provincial governors pecuniary aid, inviting them to state the amount required to collect creditable exhibits in their provinces for the museum and World's Fair.

Nothing was left undone to secure the sympathy and support of as many collaborators as possible, even the census enumerators being induced to join our staff. Governor Taft urged all Government authorities throughout the Islands, by telegram and circular letter, to contribute effectively to the coveted success. A Manila journal, in the true spirit of the Board's endeavors, said editorially:

The Philippines must not neglect its opportunities at the St. Louis Exposition. A good appropriation has been made for our exhibit. A capable Board is in charge and the work progresses favorably, but what is most needed is the holding up of the hands of the committee by the business men of these Islands.

In order to devote all its energies to the soliciting and collecting of exhibits, the Exposition Board requested the Bureau of Insular Affairs, Washington, to prepare Part I of its catalogue in the form of a precise description of the Philippine Islands. This part is compiled principally from the exhaustive data supplied by the departments of the Insular Bureaus and the military authorities of the Philippine Islands, and is the work of Mr. M. E. Beall, chief of the compilation and translating division, under the direction of Col. C. R. Edwards, Chief of the Bureau.

Notwithstanding the failures in its many endeavors for immediate success, the Exposition Board, on January 12, was able to make a satisfactory showing of its activity and energy. January 15, when all the municipal presidents had gathered together in the capital of each province, the Board asked the different governors, by telegraph, for lists of exhibits to be reasonably expected, announcing at the same time that the preliminary exposition or the permanent museum of the Exposition Board would be opened on Washington's Birthday, February 22.

Not content with the promises made by the provincial governors and committees, by merchants, manufacturers, producers of all sorts, and the leaders of the political parties, the Board sent throughout the Islands a number of collectors to gather exhibits, and advanced money to school-teachers and scientific collectors to enable them to aid in increasing its collections. It also subsidized such exploring expeditions as that of Dr. Freer to Paragua, with Dr. Sherman, Messrs. Applegate, McCaskey, and Merrill as companions, in order to secure large quantities of gutta-percha, almaciga, wood, photographs, and products of all sorts. During this time printed matter and circulars were freely distributed, many visits from exposition committees were received, and a bureau of infor-



mation started, with the purpose of showing the identity of the interests of the Exposition with those of business men and their expectations in future commercial relations with the United States and the world at large. Under the guidance of Mr. Pedro A. Paterno the members and employees of the Board visited a large number of prominent people and families in order to secure superior exhibits. An insurance policy against loss by fire was taken out. The Board's premises were beautified, electric lights installed, showcases and glassware acquired, and two houses for orchids erected by Mr. Manuel de Yriarte. Finally 2,000 invitations were issued in the name of the Civil Governor, the Philippine Commission, and the Exposition Board for the opening of the museum on Washington's Birthday, its rooms being well filled with thousands of selected exhibits, obtained from over a hundred exhibitors.

The ceremonies were attended by Governor Taft, members of the Commission, Major-General Davis, the Apostolic Delegate, the consular body, the chiefs of Departments of the Civil Government, the military authorities, and other invited guests.

This first step of the Exposition Board was considered a great success, and the favorable comments enthusiastically given greatly influenced the Filipino people at large to make further contributions.

After the opening of the museum, numerous though relatively small collections arrived from Tarlac, Zambales, Sorsogon, Abra, and other provinces or were sent by the collectors, whose number had now been increased. A number of exceptional collections had to be purchased. A few days after the opening Mr. Niederlein made a trip to the southern islands—Paragua, Jolo, Basilan, and Mindanao—augmenting collections and arranging a concession for a great Moro village in the Philippine grounds in St. Louis. An important contract was made with Father Algué for the reproduction of a first-class meteorological observatory at St. Louis, and for a series of important relief maps, among which there was to be an economic map 110 feet in length and 70 feet in width.

About the same time Captain Macomb, in charge of the Bureau of Military Information, Division of the Philippines, took charge of the military exhibit. By a cablegram dated March 7 the Exposition Board was notified that by a new agreement with the Louisiana Purchase Exposition a further amount of \$100,000 was secured for the exposition work in St. Louis, under the condition that this sum should be refunded by the Insular Government in case the Exposition Company should not be reimbursed by Congress after the close of the exposition.

The collection of material for the exposition was energetically pursued, and 500 showcases, 12,000 glass jars, and other material to hold the expected collections were ordered.

At the end of March there were over 4,900 exhibits, of which 384 belonged to the educational department; 282 to the department of art; 1,298 to the liberal arts; 492 to the department of manufactures; 602

to the department of agriculture; 279 to the department of forestry; 472 to the department of mining; 231 to the department of fish and game; 972 to the department of ethnology, etc.

In the month of April the museum was also opened on Sundays and holidays, because of the great number of people interested in the collections on hand. During that month all the details for an architectural contest for buildings to be erected in the Philippine grounds in St. Louis were outlined and awards fixed. The architectural contest was held in May under the presidency of Mr. Edgar K. Bourne, Chief of the Bureau of Architecture, and the following prizes were awarded: First prize of 1,000 pesos to A. E. Anderson and Guy H. Mahurin, second prize of 750 pesos to R. de la Rosa, third prize of 500 pesos to Guillermo Gardiner, and fourth prize of 250 pesos to Isabelo Tampinco. In April also, in order to properly receive and display the incoming collections, the adjoining building, known by the name of "La Giralda," was rented. Soon afterwards the agricultural, horticultural and forestry, mining and industrial products were installed therein, filling the building at once. The Government Laboratories were now extensively used for assays and other investigations. The offer of the Agricultural Bureau to loan its fiber expert, Mr. Edwards, for the purpose of collecting an exhaustive fiber exhibit was gratefully accepted. With the books loaned and donated by Mr. Pedro A. Paterno and books bought by Mr. Niederlein for consultation, a library was formed and opened for the use of the public. After the arrival of an expert anthropologist, Dr. Daniel Folkmar, interesting plaster casts were made of characteristic types representing the races of the Islands. This collection has gradually become of high scientific value in connection with measurements and photographs made for a comparative study of races and their mixtures. On April 15 the collections had increased to 6,000 exhibits. Up to this date only \$18,000 had been expended. In April Colonel Heistand, adjutant-general, Division of the Philippines, requested the assistance of all military commanders, officers, and men. In the same month Mr. Hager, pedagogical expert, was put in charge of the educational exhibit. At the end of the month Dr. Wilson, the chairman of the Exposition Board, arrived in company with Vice-Governor Wright. He came to inspect the exposition work and its progress, to have an interview with the Philippine Commission, to arrive at an understanding with the members of the Exposition Board, and to receive instructions for his work in St. Louis. Soon after arrival he went to Benguet, where Governor Taft and the Philippine Commission had assembled. He suggested to them that the permanent museum and the preliminary exposition be abolished and that some other changes be made in the exposition law with respect to the representation of the Board in St. Louis, which suggestions the Commission adopted May 25. He also pressed the Commission for more funds.

On the return of Dr. Wilson from Benguet the Board took up with him in detail the discussion of site, kind, size, and cost of buildings and arrangements of ground at the exposition, and authorized him to make contracts, to grant concessions for restaurants, cafés, fruit, candy, and soft-drink stalls, etc., on the Philippine grounds, to appoint the necessary staff for the supervision of his work in St. Louis, and to collect the promised sum of \$100,000 from the Louisiana Purchase Exposition Company. Mr. Erwin was appointed clerk to Dr. Wilson, and Mr. Lacayo selected to take over a large number of Filipino laborers for the erection of typical Filipino houses on the exposition grounds.

Among other matters, the desirability of substantial exhibits of art were discussed and agreed upon, the rapid shipment of the exhibits recommended, and the sending of representatives of the non-Christian tribes with the necessary houses, utensils, implements, etc., was decided upon as necessary to make the Philippine display complete. Preliminary steps were taken for the sending of the Constabulary band in an increased number, and two companies of Constabulary, to be composed of men selected from the principal native tribes in the Islands, as well as a battalion of four companies of Philippine Scouts, similarly selected.

The proposition of the Board of Health for an elaborate exhibit was considered and the necessary amount of money voted. Another excellent proposition from the Government Laboratories found the same support, and Dr. Barrows's elaborate plans for a great ethnographic exhibit were approved. The Board having previously voted to each provincial governor 500 pesos for purchase of exhibits of exceptional merit, by the 20th of May, when Dr. Wilson left for the United States, 10,000 exhibits had been received; by the end of the month this was increased to 12,000, and the packing of the material on hand was begun under the competent direction of Mr. Geo. P. Linden.

In June the first shipment for St. Louis, about 570 tons, was forwarded on the *Kilpatrick* to New York. During the same month the successful prize winner in the architectural contest, Mr. Anderson, was engaged as architect for the Exposition Board, to prepare the plans of the grounds and buildings. After the approval of the same by Governor Taft and the Civil Commission he left on June 25 for the United States. In June \$1,000 was voted for a custom-house display. The Board also agreed to aid the Constabulary Band by the purchase of stringed instruments, in order to enable them to attract greater attention to the Philippine exhibit. During this month and the next large purchases were made of material for Filipino buildings, which was prepared for shipment on the U. S. A. T. *Dix*. On the same steamer were shipped a large number of tree ferns and palms prepared by Professor Lyon to be exhibited alive at the Exposition. Thirty builders were engaged to leave on the U. S. A. T. *Sherman*. At the end of June the collections

had increased to over 15,000 exhibits, from Samar, Romblon, Masbate, Pampanga, and other provinces.

In July a new committee of art was appointed. The governors of the provinces were asked for a precise description of their respective territories, to be used in St. Louis for a well-organized propaganda. The Chiefs of Bureaus were again requested to prepare and remit their exhibits before the end of August and to give a concise account of the work accomplished by their Departments. The Bureau of Coast Guard and Transportation asked and received \$1,250 for the preparation of its exhibit. Letters were again directed to the American Chamber of Commerce, asking their participation at the World's Fair. The appeal was favorably entertained, the president, Mr. Heacock, taking immediate action. A spontaneous offer of assistance was also made to the Exposition Board by the Philippine Chamber of Commerce, through its president, Mr. Francisco Reyes. In July Maj. Frank de L. Carrington, First United States Infantry, took charge of the four companies of Native Scouts, which will be a part of the official guard of the Philippine exhibit.

With the approval of Governor Taft, a contract with the celebrated artist, Isabelo Tampinco, for a Rizal monument to cost \$3,500, gold, to be erected in the Philippine section of the Fair, was made. Another contract was made with the well-known Filipino painter, Resurreccion Hidalgo, Paris, for a great allegorical painting representing the Philippines being led by the United States to progress and liberty, to cost 25,000 francs. The collectors, Mr. Gillies, Dr. Miller, Valentin Wilson, J. Luna, Charles Hall, Gerbrich, Radtke, d'Erf Browne, Juan de Juan, and others, were furnished with more means of rapidly increasing the exhibits. One of them, Mr. Juan de Juan, brought from Cagayan a petrified head, apparently of an *elephas indicus*, demonstrating that the elephant had at some time been a part of the mammiferous fauna of Luzon. Additional funds were voted the governors with which to purchase more exhibits. The former lieutenant-governor of Lepanto-Bontoc, Mr. Hunt, was engaged as manager of the Igorrote exhibit and immediately sent with the necessary funds into the field. A collector in Jolo was authorized to spend 4,000 pesos in the purchase of pearl shells and other marine products, in order to represent fully this most important industry of the southern islands, and Dr. Barrows and Dr. Sherman received considerable sums with which to procure large collections for the Fair on their trip through the southern islands. Arrangements were made with Brigadier-General Allen, Chief of Constabulary, for the erection of two buildings of nipa in the Philippine grounds for the Constabulary, and with a prominent Filipino, Sr. F. Calderon, for a history of the Filipino people.

In July, with the approval of Governor Taft, May 1 was decided on as Philippine Day at the World's Fair, and was also declared the opening

day of the Philippine exhibit. The Committee of Ceremonies in St. Louis was requested to issue the necessary invitations to the President and Cabinet, Members of Congress, diplomats, governors of States, and military and naval authorities for the opening ceremonies. After considerable cabling, freight rates were reduced from \$24 a ton from Seattle, San Francisco, or New York to St. Louis to \$12 per ton from Manila to St. Louis. The first concession contract was ratified, Messrs. Deputy and Moody depositing \$500 in the Insular Treasury and \$10,000, United States currency, in the United States, as bond for the faithful fulfillment of their concession referring to the sale of photographs, erection of a cinematograph, a stereopticon, etc., on the Philippine grounds. The Exposition Board also resolved to send at once the mineral collections to St. Louis for classification by a competent man of the Geological Survey, Washington.

The U. S. A. T. *Dix* took 3,940 tons of exhibits and building material, 500 showcases ordered from Japan, and the first ten builders. During July and August the usual newspaper propaganda was carried on, telegrams, circulars, and letters were issued in order to assure more exhibits, the revised description of the Philippines went to the printer, more appeals were made to the public, to manufacturers, and producers, provincial governors and committees were specially urged to pay particular attention to the exposition work after the census work was completed, a number of contracts were made for artistic furniture, paintings, and other works of art, the Philippine Commission, by Act No. 824, increased the insular appropriation for the Exposition Board to \$500,000, gold, by Act No. 827, ordered a number of exhibits to be shipped back after the closing of the World's Fair for a permanent Philippine museum in Manila, and the Board engaged new collectors to replace others who had resigned. With the increase of work a raise of salary was agreed upon for the American and a number of the most faithful and active Filipino employees, and Mr. Fenner, member of the American Chamber of Commerce, was appointed to take charge of its department of commercial information and of foreign imports, of which about 3,000 samples had gradually been gathered, with full information about the same. The number of exhibits at the end of July had reached 24,000; at the end of August 30,000, of which 29,000 were catalogued. At the beginning of August the Board issued an alphabetical list of 1,500 exhibitors, which increased to 2,000 by the end of the month.

As it now became necessary to prepare Part II of the Official Catalogue (the real catalogue of exhibits) for the printer, Mr. G. d'E. Browne was put in charge, with Mr. Applegate and Mr. Arnold as assistants. During August the incoming mineral exhibits had increased considerably, and Mr. Thanish, a competent mineralogist from the Government Laboratories, was put in charge. A chemist, Mr. Walker, of the same Bureau, was intrusted with the analysis of dyestuffs and tan barks, while

Dr. Sherman continued the chemical analyses of all kinds of minor forest products; Mr. Fox continued his labors as assayer of ores; Mr. Merrill the preparation of the herbarium of useful plants; Mr. Chas. S. Banks the preparation of a great exhibit of insects of these Islands; and Mr. L. M. Guerrero, Secretary of the Exposition Board, the classification and description of the economic plants accumulated in our buildings from all parts of the Islands.

Haste was urged upon members of committees throughout the Islands by circulars, in view of the approaching date of the final shipment, which was set for November 15. August 8, 550 tons were shipped on the steamship *Pleiades*. In order to save valuable exhibits from the effects of the rainy season, all art products, such as paintings, wood carvings, etc., were cased and made ready for shipment on the *Coptic* in the following month. In August 30 Filipino builders were sent, with Mr. Barbaza, taxidermist, on the *Sherman*. On the transport *Logan* the Board had previously shipped a considerable number of fishes of the Islands, collected by Messrs. Pierson, Barbaza, Hall, and others, to be identified by the United States Fish Commission, Washington.

During September some time was spent in determining those kinds of exhibits still lacking in the collection of the Board, and letters and telegrams sent to committees and collectors to make the Philippine exhibit complete. In the middle of September about 270 tons of the most select exhibits were shipped on the *Coptic*. At the beginning of the month the German consul, Dr. Grunenwald; the British consul-general, Hon. William Jos. Kenny; the French consul, Hon. G. de Berard; and the Spanish consul-general, Mr. N. Rivero, offered their assistance to the Board for collective exhibits from their countrymen, which the Exposition Board accepted.

In September the provincial governors, provincial committees, and the division superintendents of schools reported great activity throughout the Archipelago. Governor Hunt, manager of the Igorrote exhibit, sent a large collection from Lepanto-Bontoc, which required over 200 Igorrote cargadores to transport.

By the end of September 43,162 exhibits had been gathered, as follows:

Furnished by Department of—	Number of exhibits.	Number of exhibitors.
Manufactures .....	10,954	2,430
Agriculture .....	7,954	2,091
Forestry .....	7,674	1,064
Fish and Game .....	5,749	558
Horticulture .....	3,530	120
Anthropology .....	2,504	214
Liberal Arts .....	2,102	207
Education .....	1,016	66
Mines and Metallurgy .....	729	503
Fine Arts .....	498	139
Transportation .....	252	130
Military Supplies .....	180	1
Machinery .....	14	10
Social Economy .....	5	1
Physical Culture .....	1	1
Total .....	43,162	7,537

The provinces which have distinguished themselves with a very large number of exhibits are, in the order of the total amount, Samar, Tarlac, Ilocos Norte, Pangasinan, Ilocos Sur, Mindanao, Zambales, Pampanga, Tayabas, Sorsogon, Cagayan, Abra, Mindoro, Iloilo, Bulacan, Negros Occidental, and Nueva Ecija. Every province is represented.

With the exception of the department of electricity all departments mentioned in the official classification of the World's Fair are represented in the Philippine collection.

The Philippines are represented in 103 groups out of 144 and in 308 classes out of 807.

The packing of exhibits continued with vigor. A shipment of 26 large logs for the Philippine forestry buildings left September 26. Another shipment of over 300 or more tons of delicate exhibits will leave early in October.

Among the exhibits there will be a collection of over 3,000 samples of imported foreign goods, intended to show to the world at large the taste, needs and purchasing power of the 7,000,000 Philippine people.

The disbursing officer, Mr. Carson Taylor, gives the following account of money expended by the Board during the preparation of the Exposition :

Salaries and wages.....	\$37,770.62
Exhibits and contingent expenses.....	37,363.79
Office supplies, show cases, jars, traveling expenses, freight, repairs, etc..	13,062.33
Advertisement in newspapers.....	631.76
<b>Total.....</b>	<b>88,828.50</b>

The comprehensive index of this catalogue is the work of Mr. Thornton Clarke Chase.

Everything seems to indicate that the exposition will be an unqualified success and will be crowned with results whose far-reaching influence will secure for the Philippine Islands that interest they so much need and deserve. It remains for the United States to build in the Philippines the basis of America's higher mission in the countries of the Orient.

G. N.

MANILA, *September 26, 1903.*

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# DESCRIPTION OF THE PHILIPPINES.





## Chapter I.

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### TOPOGRAPHY.

[Revised by Rev. Father José Algué.]

**Scenery — General outlines — Coast line — Adjacent waters — Area — Important islands — Mountain systems — Mountain system of Luzón, Mindoro, Negros, Panay, Mindanao — Rivers — Rio Grande de Cagayan — The Agno — The Abra — Rio Grande de Pampanga — The Pasig — Rio Grande de Mindanao or Pulangui — The Agusan — The Agus.**

One enthusiastic writer calls the Philippines a magnificent rosary of glowing islands that nature has hung above the heaving bosom of the warm Pacific. The combination of mountain and plain, lake and stream, everywhere rich with glossy leafage, clustered growths of bamboo and palm, fields of yellow cane, groves of banana, great reaches of growing rice, and groves of verdant coffee resulting from an abundant rainfall, a rich soil, an even climate, and a warm influence of equatorial waters tend to make a picture richer by far than nature ever painted in the temperate zone.

The general outlines of the Philippine Archipelago are those of a triangle with the base to the south and the apex formed by the small islands north of Luzón. The water area of this triangle is far greater than that of the land. In the southwest is the great Joló Sea, surrounded by the Islands of Panay, Negros, Mindanao, the Joló Archipelago, and Paragua. East of the Joló Sea, north of Mindanao and south of the Island of Bohol, is the Mindanao Sea, and still east of that body of water is the Surigao Sea. Between Bohol and Cebú is the Sea of Cebú, and the Islands of Cebú and Negros are separated by the Strait of Tañón, while Negros and Panay are divided by the Strait of Guimará. The Visayan Sea is north of Panay and south of Mindoro, and the latter island is separated from Luzón by the Verde Island Passage. To the east of the Philippines is the Pacific Ocean, the Célebes Sea lies to the south, while the China Sea is found on the west.

Most of the large islands, such as Luzón, Sámar, Leyte, Panay, Palawan, and Mindanao, have irregular coast lines, the seas cutting in and making many bays, capes, and promontories. The plains are, as a rule, found along the rivers in their lower reaches and between the mountain ranges, whose general trend, like that of the islands and the waters that separate them, is north and south. The lowlands are rich with the accu-

mulated alluvial deposits of ages. Most of the bays are deep, but the larger streams deposit bars at or near their mouths, thus preventing the entrance of seagoing vessels, though they offer good anchorage some distance from the shore. Vessels are loaded and unloaded by means of lighters.

The Archipelago is bounded on the north by the China Sea, on the east by the Pacific Ocean, on the south by the Célebes Sea and Borneo, and on the west by the China Sea. The nearest land to the north is the Island of Formosa, a dependency of Japan, taken from China in 1894, and situated but 93 miles from Y'Ami, the most northern of the Batanes Group; on the east the Pelew Islands (German), 510 miles distant from Mindanao; on the south Ariaga (de la Silla Island), the most northerly of the Carcaralong Group (Dutch), 37 miles south of the Saranganis, off the coast of Mindanao; on the southwest the extreme eastern point of Borneo is but 24 miles southwest of Sibutu; and on the west is Cochin China, 515 miles west of Paragua.

The waters surrounding the Philippines are very deep, not far from the east coast the Pacific being from 4,000 to 6,000 meters in depth. The Joló Sea, between Mindanao and Joló, reaches a depth of 4,069 meters; off the Célebes 3,750 to 4,755 meters, and not far from the south coast of Mindanao the depth reaches 5,000 meters, or a little over 3 miles. Nevertheless, the Philippines are united to the Asiatic Archipelago at two points where the straits filled with islands reach but little depth, namely, north of Borneo by the Joló Group and on the northeast of Célebes by the Islands of Sauguir and Talut.

Without doubt, therefore, the whole of the Philippine Archipelago belongs to the same geographical region as Borneo, Sumatra, Java, and the other islands of the great Asiatic Archipelago, and in consequence to Asia rather than Oceania. Considering, therefore, both geographical and geological indications, it is sufficient to note the analogy which the situation of the Sunda Islands, the Célebes, the Moluccas, and the Philippines bear to Asia, and that which the Antilles bear to America. The former bound the interior China and Sunda Seas, the latter the Gulf of Mexico and the Caribbean Sea, washing, respectively, the Asiatic and American coasts. According to this analogy, therefore, if the latter belong to America the former belong to Asia.

The Archipelago lies between parallels  $21^{\circ} 25'$  north and  $4^{\circ} 45'$  north, and meridians  $116^{\circ}$  and  $127^{\circ}$  east of Greenwich, or a total of 1,152 miles from north to south and 682 miles from east to west. The exact treaty limits as defined by the treaty of Paris may be found by reference to Appendix A.

Manila is 6,943 miles from San Francisco, via Honolulu, and to go from Manila to New York via the Cape of Good Hope requires a journey of almost 14,000 miles, while by way of the Horn the distance is 17,000, but this can be shortened to a journey of 11,600 by taking the Suez route. The difference in time between Manila and other parts

of United States territory is therefore very great. When it is 12 o'clock noon, standard time, at Washington, D. C., it is 1 o'clock a. m. the next day at Manila, Philippine standard time, a difference of thirteen hours.

The area described by the treaty boundaries contains 832,968 square miles, of which it is estimated that 128,000 is land, and, until a survey is made, all statements as to the areas of the different islands composing the Archipelago can only be approximately accurate; but even taking the above conservative estimate as a basis, the Philippines are 7,000 square miles larger than the combined areas of England, Scotland, Ireland, and Wales. They are nearly as large as Spain, while Luzón alone is equal to the combined areas of Denmark, Belgium, and Holland, and the fertile Island of Mindanao has an area almost equal to that of Portugal.

Compared with areas of certain of the United States, the Philippines are larger than the States of New York, New Jersey, Pennsylvania, and Delaware and nearly twice as large as the six New England States. Measured by the square miles contained in most of the European countries the Philippines becomes one of the important political divisions of the globe. For a list of the more important islands and groups, together with their area and population, see Appendix B.

Notwithstanding the fact that it is almost four hundred years since the flag of Spain was first raised in Philippine territory and its metes and bounds have been traced upon the maps of the world, the Archipelago is practically a new country. It is true that Hernando de Magellan, sailing on and on without chart, on what must have seemed an illimitable ocean, sighted the Island of Cebú, but that island has not yet been surveyed nor thoroughly explored. It is true that nearly fifty years later the white-winged fleet of Miguel de Legaspi, with canvas bellied with variable tropical winds, in devious course wended in and out among the Philippine Islands and in 1571 proclaimed Manila to be the capital, yet during all these centuries that have elapsed there has been but little more thorough exploration accomplished than the coast lines and the more important river valleys.

Large islands remain unpopulated, and the interior of others are as unknown to-day as the territory around Lassa, the capital of Thibet.

The mountain system of Luzón, the most important island of the whole Archipelago, is composed principally of three large ranges, whose springs form the sources of four full rivers, which flow through the island in different directions and irrigate it so richly and so fertilize the valleys with their abundant waters that there is scarcely a province which does not produce in abundance the fruits natural to it.

The nucleus of this mountain system is called Caraballos Sur, whose highest peak (1,400 meters) is situated in longitude  $121^{\circ} 4'$  east from Greenwich. The first of these ridges, called Caraballos Occidentales, runs

approximately north and is divided into two parts, that of the central range, which runs three-fourths of its length before it separates, between the Provinces of Abra, Ilocos Norte, and Cagayán, and that of the north range, which runs from the division mentioned to the most northern part of Luzón, called Mayraira Point. It separates the Provinces of Pangasinán, Unión, Abra, and the district of Benguet from those of Nueva Vizcaya, Isabela, and Cagayán. Departing from Cabalisían, near Caraballos Sur, toward the north, the district of Benguet, in which rise the ridges of Piños and Bayabas, is left to the west of the principal range. The mountains of Biumaca, Tapán, Cabuman, Tonglón, Lugsen, and the peak of Bayabas are the most important of the heights between Unión and Benguet. To the north of Caraballos Sur is Mount Data (2,500 meters), one of the most conspicuous of the whole region. Its branches run in the general direction of north and south. Among them rises the Sabagan Range, which extends toward the district of Bontoc to the east, and also the chain called Polis, the highest region of all that country.

The second important range, called the Sierra Madre, begins at Caraballos de Baler, situated southeast of Caraballos Sur. It extends in the general direction of northeast, and altogether forms a continuous chain of mountains which extends from Caraballos de Baler to Cape Engaño, in the northern part of the island, crossing the Provinces of Isabela and Cagayán.

Its length is somewhat greater than that of the Caraballos Occidentales, but its exact length has never been accurately determined, nor has it been possible to determine the height of its principal peaks.

The third important range beginning at the Caraballos Sur has a lower elevation, and its direction is also more irregular than the two others, while its length is at least twice that of the Caraballos Occidentales. It extends from the Caraballos de Baler to the Strait of San Bernardino. Its trend from its point of separation to the boundary of the Provinces of Laguna and Tayabas is north and south. From Banahao the range turns to the southeast and maintains this direction until near Guinayañgan, in the Province of Tayabas, where it divides into two spurs.

Most of these mountains are forest clothed. In the higher elevations are found large pine trees, with open spaces between carpeted with pine needles, but lower down huge trees tower to an enormous height. These mighty forest monarchs are draped and festooned with fantastic creepers and beautified with graceful ferns and exquisite orchids. Vegetation runs riot. Unlike Hawaii, the Philippines have few if any barren lava beds, none of the bare desolate shores of northern coasts, and are free from sandy deserts. The flora is so rich that it makes a paradise for the florist, and for the botanist it is a wonderland.

On the Island of Mindoro is found Mount Halcon, situated in the northern part at an equal distance from the eastern and western coasts,

and the mountain system dividing into three ranges starts from that point. One trends northwest and southeast and the other two from the north to the south. The northern range is almost parallel to the other two, and they, on account of being parallel not only to the coast but also to each other, give rise to a large central plain between. The interior of the island is but little known, on account of the absolute lack of communication across the mountains between fishing villages on the opposite coasts.

The frame of the mountain system of the Island of Negros is formed by a large range which crosses the island almost from north to south and by various spurs branching from it and running in opposite directions and ending on both the eastern and western coasts of the island. Panay has about the same distribution of its mountain ranges, and therefore the rivers of both islands are short, running, as a rule, east and west, with a rapid descent, especially in their upper portions, where they spring from precipice to precipice in their hasty journey to the sea.

The mountain system of Mindanao, on account of the great changes which that island has experienced through the eruption of volcanoes and the destructive action of earthquakes is not easily defined. The volcano of Apo and the mountain of Matutun constitute the nucleus from which rise two of its principal ranges. Apart from the rest of the system, which is not easily defined, there can be distinguished four ranges, called, on account of the position which they occupy, the eastern, central-eastern, central-western, and western range. They give rise to large rivers, which, flowing through the island in all directions, enrich it with the tribute of their waters, and many of the valleys are wide and fertile, while the slopes of the mountains are covered with dense forests, through which with difficulty the explorer must penetrate before the topography of this great island can be accurately known.

The river systems of the Islands are better known than the mountain ranges, for they have been in the past and are to-day the arteries of commerce along which the products of the interior are carried to tide water. There are four large rivers in Luzón which flow in opposite directions for nearly the entire length of the island, namely, the Rio Grande de Cagayán, the Agno Grande, the Abra, and the Rio Grande de la Pampanga. Their basins are determined by the three great mountain ranges already mentioned as belonging to the system of the Caraballos.

Among the rivers of Luzón the Rio Grande de Cagayán, sometimes called El Tajo by the Spaniards, easily holds the first place, not only on account of its great length but also by reason of the volume of water it carries to the sea. It drains all the territory embraced in the region lying between the western Caraballos, the Sierra Madre, and the southern Caraballos. It flows first in a northeasterly direction, and after receiving the waters which come from the eastern slope of the Mamparan Range and those which come from the western slope of the Sierra Madre, it continues

in the same general direction until it reaches Ilagan, about midway between its source and its mouth. Near Gamu it receives its largest tributary, the River Magat. From Ilagan its course with many windings is northerly, passing the towns of Cabagan, Iguig, Amalung, Alcalá, Gattaran, and Lal-lo, and finally reaches with a broad, navigable current the city of Aparri, located near its mouth, where it empties into the China Sea.

This river basin is wide, and any general system of railways for Luzón would necessarily take this valley into consideration, and the day is not distant when it will be possible to travel from Manila to Aparri by rail. The stream overflows its banks during the rainy season, and the soil of the valley is extraordinarily fertile, producing the best tobacco grown in the Archipelago. Steamers of 16-foot draft have crossed the bar and entered the river, but this bar is constantly shifting and is a serious impediment to navigation. River steamers, once inside the bar, can ascend far into the interior, and thus the products of forest and field are taken to Aparri and transferred to coasting or ocean-going vessels. The scenery, as the traveler ascends the river, is beautiful and varied. In places the flanking hills crowd up close to the stream and are clothed from water line to the summit with verdant forests knitted together with vines and creepers, making a shade so thick that the sun's rays can not penetrate to the soil. The valley will then widen out, making room for fields of rice, cane, and tobacco, intersected by small streams that come dancing down from the mountain walls that guard the valley both on the right and the left.

Mr. Willis Bliss Wilcox, paymaster of the United States Navy, descended the Cagayán in 1898 and gives the following description of the scenes through which he passed:

Here and there were alligators stretched out upon the banks, at which we frequently shot with our rifles. Monkeys without number infested the trees, disporting themselves as only monkeys can, assuming many amusing attitudes and performing numerous highly creditable acrobatic feats. Many fishermen had their nets out, and thousands of women were washing clothes and bathing in the discolored waters. At times the river widened to a great expanse, then, closing in at a narrow gap, the immense body of water forced its way with such speed that we were literally lifted up and shot through the channel as though fired from a 10-inch gun.

The Agno is the second in importance among the rivers of the Island of Luzón. It takes its rise on the southern slopes of Mount Data near the boundary between Benguet and Lepanto and the Province of Nueva Vizcaya. It crosses Benguet from north to south and Pangasinán from northwest to southeast till it reaches the southern border of the province. Then between San Nicolás and Tayug it begins to form a great sweep, which continues in direction from northeast to southwest, passing though Rosales, Alcalá, and Bayambang, and after receiving the waters of the River Tárlac a little farther south inclines toward the northwest, water-

ing the boundaries of Urbiztondo and Aguilar. It then divides into two branches near Salasa, one flowing northeast and ending at Dagupan, while the other flows to the west, both branches emptying into the Gulf of Lingayén. This stream is navigable for quite a distance, save in the driest season, and many native craft ply up and down the stream. The chief tributary of the Agno Grande is the Tárlac, which enters from the south. The Manila-Dagupan Railway running north from the town of Tárlac valley crosses the Agno at Bayambang. This road traverses a wide plain, densely populated and from which practically all of the timber has been removed.

From Bautista to San José the country is much the same as along the railway and the same crops are cultivated. Upon approaching San José the country becomes more hilly and rolling, about one-half of the area being forested and the other half covered with coarse grasses, with an admixture of finer sorts, while the foothills and mountains are clothed with a dense forest growth.

From San José to Carrangalang, Pangasinán, and Nueva Écija the trail at first leads through a rough, densely forested country, but soon one comes out into open, rolling country, the hills densely covered with magnificent grazing grasses, the ravines, higher hills, and surrounding mountains being densely forested. The country is well watered with numerous small, clear streams, one being found in every little valley. Between San José and Carrangalang, and from the latter place northward toward the mountains, and probably also in other directions from that town, there are hundreds of thousands of acres of these grazing lands entirely unutilized. Between Carrangalang and Dupax, Nueva Vizcaya, the trail passes over forested mountains, the Caraballos Sur, but over the range one comes into the valley of the Magat River, and here, on a much more extensive scale, are repeated the grazing lands, similar to and even better than those in Nueva Écija, in the river valley, over the foothills, everywhere throughout the province.

Nueva Vizcaya is a very rough, mountainous province and contains but six incorporated towns, although there are many Igorrote "rancherías" scattered about in the mountains. No roads passable by wagon lead into the province, although good roads exist between the towns which are situated in the river valley.

Magnificent grazing lands exist in eastern Pangasinán, northern Nueva Écija, Nueva Vizcaya, Isabela, and Cagayán, probably also in the other provinces, mostly rolling uplands in the three former provinces and broad level prairie lands in the two latter, although so far as abundance and quality of the grasses are concerned there is apparently no difference, the same species growing on the prairies as on the hills. These grasses consist of one or two species of *Panicum* and *Eragrostis*, and many representatives of several genera of the *Andropogonæ*, all fine-stemmed, fine-leaved grasses, which, in the United States, would be popularly known as



"bunch" grasses, as they mostly grow in small tufts, not being true turf-forming grasses, yet there is a sufficient abundance of turf-forming or partially turf-forming grasses so that, notwithstanding the heavy tropical rains to which this region is subject during several months of the year, so close is the turf that absolutely no signs of gullying or washing were observed even on the very steep hillsides, except along the trails where the turf had been first broken by horses and carabaos, which shows what may be expected if cattle are ever introduced here in abundance. Near the streams and in the river valleys abound rice paddies, etc. Bermuda grass (*Cynodon dactylon*) is abundant, and as one approaches the coast Korean lawn grass (*Osterdamnia matrella*) is found everywhere. This species can, however, be of little value for grazing. Near the rivers and in some of the ravines and small valleys great, coarse, reed-like grasses, 10 to 15 feet in height, are abundant; but these coarse grasses occupy but a comparatively small per cent of the total area.

The grazing lands in eastern Pangasinán, northern Nueva Écija, and throughout Nueva Vizcaya are characterized by their hilly, rolling character, the ravines and small valleys, tops of the higher hills, and surrounding mountains being densely forested, while in every small valley one finds streams of clear, pure water, it being impossible to travel more than three or four miles in any direction without finding good water. Hence, it will be observed, that there is an abundance of feed, water, and shelter, the requisites for an ideal cattle country; and especially to be noted here are the topographical features of the country, which, in case of epidemics of rinderpest, are of especial value, as in these valleys whole herds of cattle can be isolated and, with a little care and watchfulness, guarded for months against infection by contact or through the water supply.

The water supply is especially to be noted, as in the numerous mountain streams the water is perfectly pure and as clear as crystal, except immediately following a heavy rain. These streams during the rainy seasons, like the great rivers, are subject to a great and sudden rise and fall, and from a quiet babbling brook may change in a few minutes to a raging torrent; yet where the mountains are heavily timbered the rise and fall are more gradual and do not go to extremes.

The grazing lands of Isabela and Cagayán differ from the above in being almost perfectly level, or but gently rolling typical prairie lands almost as far as one can see in all directions, limited by the coast range on the east and the great central range on the west, and extending from some distance south of Córdón north to the coast. The same species of grasses are found here as in the ranges of Nueva Écija and Nueva Vizcaya, and the quantity and quality are about the same. This great valley consists of open country with isolated trees, or sometimes small groves, with more or less forest land along the streams. The country is well watered by the numerous tributaries to the Cagayán River. In this valley the unbroken ranges are far more extensive than in the

mountain regions, but, at the same time, in case of an epidemic of rinderpest, there is not the same opportunity of isolation as a means of protection against the disease.

The third important river of Luzón is the Abra, descending from the northern slopes of the Data, forming the watershed between it and the Agno in Lepanto. It gathers at the beginning the waters from the northern and western slopes of the Data, and those of its tributary, the Sayua, which, having its source on the southern declivity of the same mountain, forms a great curve toward the south. It then runs toward the north and empties into the Abra. The general direction of the Abra is from south to north as far as Tayum, in the Province of Abra. There it describes a semicircle in a southerly direction, soon continuing its southwesterly course through the mountain range which separates Abra from Ilocos Sur, and flowing on to the west empties through two mouths into the China Sea. The three rivers above described drain the greater part of northern Luzón, one flowing north well to the eastern side of the island and the other two flowing to the west. The Sierra Madre Range follows close to the eastern coast line, and as no streams of any account flow to the east the eastern part of the island remains almost virgin territory upon which the hand of man has scarcely as yet laid ax or plow.

The Rio Grande de la Pampanga is formed by the confluence of several streams which drain the southern slopes of the Southern Caraballos Range. Its general direction is from north to south, and it flows through the Provinces of Nueva Écija and Pampanga. In the first part of its course before receiving, near Arayat, the Rio Chico de la Pampanga, it waters the boundaries of Bongabon, Santos, Cabanatuán, Jaén, San Isidro, and Cabiao, all in Nueva Écija. Below Arayat it flows past San Luis, San Simón, and Calumpit, always toward the south, until having divided into numerous branches it forms a complicated network of channels and marshes which empty their waters into Manila Bay. This river winds its way through extensive fields of rice and plantations of sugar, past populous and thrifty villages and towns. Its valley was the scene of part of the earlier campaigning which followed the breaking out of hostilities between the forces of Aguinaldo and the United States.

The Pasig River, which is the outlet of Laguna de Bay, flows a little to the north of west and empties into Manila Bay. This stream is the principal means of communication between Manila and the interior to the east, the Laguna de Bay being but 18 miles distant. It is from 100 to 200 meters wide and carries a heavy commerce, the lower part, after the manner of Chinese rivers, containing many house-boats in which families live. Old Manila, or Intramuros, the Walled City, lies on the south side, the business part of the capital is on the north, the two parts being connected by bridges. Harbor improvements, for which appro-

priations have been made by the Insular Government include dredging the bar at the mouth of the Pasig; enlarging the canal leading from the new harbor to the Pasig; and the deepening of that stream above the Bridge of Spain, so as to improve the navigation of the river.

The Rivers Cagayán, Agno, Abra, Pampanga, and the Pasig are the most important streams of Luzón, and their basins include the greater portion of the area of the island.

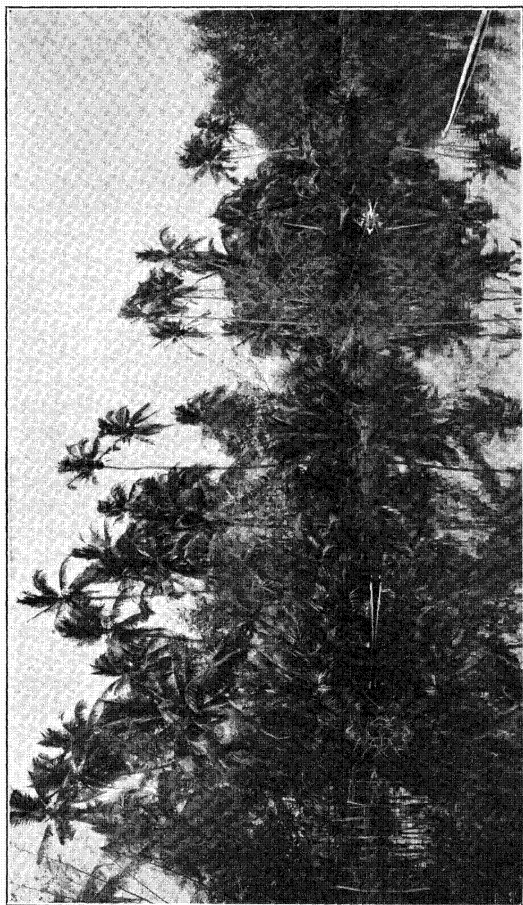
The other islands of the Archipelago, owing to their limited extent and contour, have no streams of great importance, as their highlands are usually in the interior and the water flows in all directions to the sea. The only exception to be noted is that of the great Island of Mindanao, which, although but little known, still has its fluvial system reasonably well defined.

The Rio Grande de Mindanao or Pulangui deserves the first place in the hydrography not only of Mindanao but also of the whole Archipelago, both on account of its length and the volume of water it carries. This large river rises on the eastern slopes of the Sobrac and Quimanquil Mountains of the central-western range and on the western slopes of the central-eastern range in the northeastern part of the island, in the Province of Misamis, and at a height of, approximately, 1,500 meters above the level of the sea. It descends by successive falls over the broken landings or benches, which are one of the characteristic features of this region, with a regularity that resembles a gigantic stairway. It flows among enormous rocks heaped up in the channel, which, while adding to the beauty of the river scenery, make navigation impossible. The general direction of the river is toward the south, until after a distance of 80 kilometers the Tigua joins it on the left. It then turns toward the west, passing near Linaboo and Sevilla (Mailag) and receiving the waters of the Sanaga and Malupali on the right, then twists with a slow, broad current toward the southeast, passing near Valencia and Lepanto (Salagapón), then is joined by the Culaman, and a little lower down, increased by the waters of the Marama. Still flowing to the south with various windings, another Culaman joins it on the left not far from the confluence of the Mulita, which is the boundary of the Montes, Moros, and Manobos.

Up to this dividing line, near the middle course of the river, it is called Pulangui, and from there to the mouth it is known as the Rio Grande. It is navigable to this point, and Spanish gunboats have ascended at various times. From the Mulita the river makes a sweep from northeast to southwest to Catitúan, where at one time the Spaniards had a military post. After making this great bend it receives the waters of the Marurugao, the largest of its confluent, and then again turning south with marked windings flows past the old Spanish military post of Piquit, and on until it reaches the vicinity of Lake Liguasan. After receiving the waters of this large lake the river turns

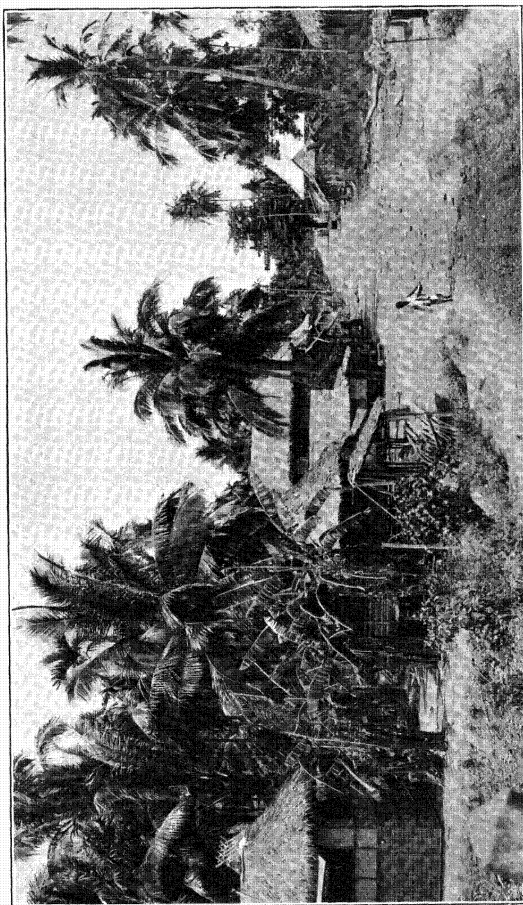


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RIVER SCENE NORTH OF DAGUPAN, PROVINCE OF PANGASINAN.

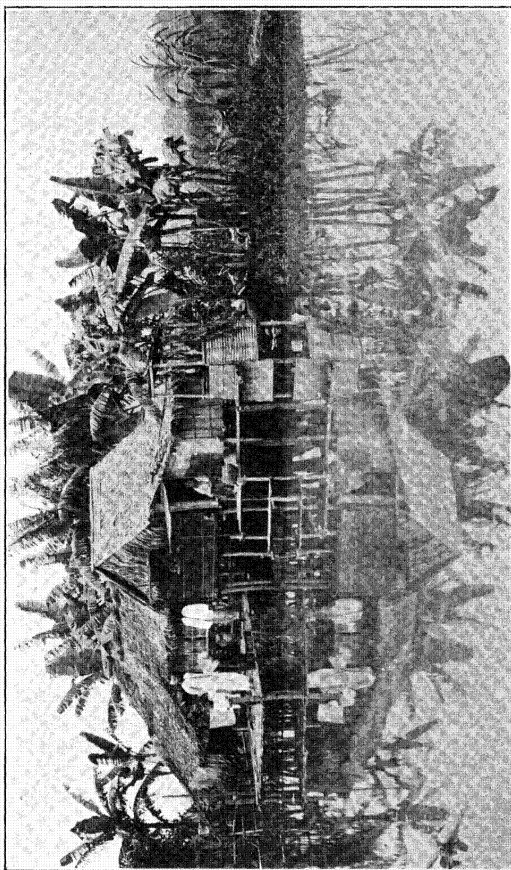




A STREET IN BAYAMBONG, PANGASINAN.



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A SUBURB OF MANILA.

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suddenly to the northwest almost at right angles to its former course and reaches the sea at Cottabato, the capital of the district of the same name. Before emptying into Illana Bay the stream divides into two branches, and Mount Timaco is situated on the island thus formed. This large insular river gives access to an extensive territory rich in timber, rubber, gutta-percha, and other forest products, though but little was ever done by the Spaniards to develop this fertile region.

The Agusan is the second river of Mindanao and the third of the whole Archipelago. Its basin is formed by the main mountain ranges of the island running almost parallel to each other, and it is fed by numerous streams, some of them having a considerable volume of water. The river rises to the east of the Bay of Davao, its general direction is almost north, and it empties into the Bay of Butúan near a town of the same name on the north coast. In its course it passes through Compostela, Moncayo, Jativa, and Patrocinio, settlements of Christianized Manobos. It spreads out near the middle of its course into Lakes Cadagun, Dugan, and Sinanat. A little below the last-named lake the Gibon flows into it from the right bank. The stream is something over 250 miles in length and is one of the arteries penetrating into the island from the north.

The Agus of Mindanao, like the Pasig of Luzón, is a short stream, but is the outlet of the important Lake Lanao as the Pasig is the outlet of Laguna de Bay. It is situated in the north-central part of the island, and the lake, though surrounded by mountains, has many fertile plains around its shores and promises to be a place of no small importance.

Those who have journeyed through the Philippine Islands unite in praising their natural beauty. Their volcanic origin, their mountain systems with their broad benches marking various upheavals, the numerous streams, the rich vegetation creeping from the water's edge to the summit of the loftiest mountains, the level plains industriously cultivated by a patient people, the genial climate and abundant rainfall all combine in making a magnificent panorama of pictures unsurpassed anywhere.

## Chapter II.

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### GEOLOGY.

Geology of the Islands uniform—Formerly swamps and shallow seas—At one time a part of Asia—Volcanic eruptions—Uplift gradual—Coral reefs—Terraces—River deltas—Mayón Volcano—Taal Volcano—Volcanic centers—Table of active and extinct volcanoes—Seismic foci—Earthquakes—Relation between volcanoes and earthquakes.

According to the latest available data the geological history of the entire Philippine Group is uniform. The post-Tertiary gradual upheaval is common to Joló, Mindanao, Luzón, and the intermediate islands, and descriptions leave little doubt that the Philippines belong and have long belonged to a single geological and biological province.

Prior to the Tertiary epoch the Philippines consisted of slates and igneous masses, the age of which is as yet unknown, as no fossils have been detected. These rocks are now to be found in the northern and eastern ranges of Luzón, and appear to be represented also by some limited occurrences in Cebú, and seem to form the walls of the gold-bearing quartz veins of the Province of Surigao, in the north-eastern portion of Mindanao. They are doubtless in reality widely distributed, but in most localities are buried beneath more recent formations.

During the Eocene, or earliest Tertiary, the Archipelago must have consisted largely of swamps and shallow seas, perhaps not very different from those now existing in the same region. Limestones were formed at some distance from the coasts, shales and sandstones were laid down near the shores, and accumulations of vegetable matter grew in the swamps. These last were covered with mud, and, in the almost total absence of free oxygen, they were gradually converted into lignite, probably the most valuable mineral asset of the Philippine Islands.

At the close of the Eocene a great crumbling and upheaval took place, which was felt from Switzerland to the Philippines, and perhaps most of all in the Himalayas, where marine Eocene beds now stand at an elevation of 16,000 feet above the sea. In the Philippines the Eocene strata are frequently thrown into a nearly vertical position, and sometimes are actually overturned. In the Visayas the axis of upheaval trended a little east of north, corresponding to the direction of greatest extension of the

Islands of Cebú and Negros. These disturbances were accompanied by much faulting, and it is believed by some metamorphism. Intrusions and extrusions of igneous rock seem to have accompanied this upheaval, but no satisfactory study has yet been made of the phenomena, good exposures being rare.

During the remainder of the Tertiary the Islands appear to have been above water. Miocene and Pliocene strata have not been detected with certainty, though some traces of such beds will probably be discovered in future investigations. Near Joló were found strata which appeared to be younger than Eocene and older than the recent period. In the main the area of the Philippines was probably continental, and there is zoölogical evidence of a land connection with the Asiatic continent, probably by way of Borneo, during the middle Tertiary. This connection did not continue to the close of the Tertiary, however, and to its rupture is ascribable the extraordinary peculiarities of animal life in the Philippines, evolution having been there left to take its own course undisturbed by invasions.

The subsidence which cut off immigration of the lower animals continued, seemingly, till somewhere about the close of the Tertiary, and long after *Homo sapiens* had made his appearance in the Malay Archipelago. This group also was very probably already inhabited during the Pliocene, possibly by the ancestors of the Negritos. This is a question which requires careful investigation, for in the opinion of the late O. C. Marsh the Philippine Archipelago is likely to have been one of the earliest haunts of the human species.

When the elevation was at its minimum the Archipelago was reduced to a group of small, hilly islets, four of which existed within the area now occupied by the Island of Luzón. Cebú was almost completely submerged.

At or before the period of maximum subsidence began a series of eruptions which has not yet closed. Mayón Volcano, in southern Luzón, had a violent eruption in 1897. The work done in fusing lavas and ejecting ash is probably a manifestation of the energy in the mighty earth throes which bring about regional upheavals with incidental subsidences. The earlier of the eruptions under discussion were largely submarine, and vast additions were made to the superficial material of the Archipelago by these outflows, especially in the central and southern parts of Luzón. The ejecta include andesites, rhyolites, basalts, and probably other less-common rock species.

The period of upheaval, once initiated, does not seem to have been interrupted by any era of subsidence, and the modern coral reefs give evidence that it is still in progress. It is said that uplifts accompanying earthquakes have actually been observed by the Spaniards, and the earthquakes themselves are spasmodic jars in the process of elevation. The

elevation has not been, properly speaking, catastrophic, however, for the tremors which may wreck a cathedral are insignificant from a terrestrial standpoint. On the whole, the uplift has been very gradual, so that even building outward into deeper water as his old home was raised too high for his welfare. In this way nearly the whole of Cebú, to a height of over 2,000 feet, has been covered with a nearly continuous sheet of coral, which can be followed seaward into living reefs. Much of Negros has been clothed with a similar mantle. On a small scale, also, off the coasts of these Islands, and particularly about Mactan, reefs can still be studied in every stage of upheaval, all those portions being dead which are exposed to the air even at the lowest tides. In southern Luzón and to the northward of Lingayen Bay similar phenomena can be observed.

Although upheaval does not appear at any time since the close of the Tertiary to have given way to subsidence, there have been repeated pauses in the uplifting process. On exposed coasts these pauses are marked by benches eaten into the land by the action of the waves. Thus the southern ends of Cebú and Bohol are terraced from top to bottom, each terrace being an old bench cut out of the rock mass by stormy seas. Pauses in the uplifting process are also marked by a rude stratification of the corals. Even in the interior of the islands terraces indicative of uplifts are frequently visible. Some of them represent base levels of erosions, others are ancient coral reefs which have been checked in their upward growth by reaching the surface of the water. In short, terraces constitute one of the most prominent topographical features of the Archipelago.

The slowness of the uplift is emphasized by the stupendous accumulation of coral in these Islands. Coral is, of course, mainly composed of calcium carbonate, and this is formed by the coral polyp from the lime salts dissolved in the sea. Now the sea contains a very minute proportion of lime salts (chiefly the sulphate of gypsum), say a tenth of 1 per cent, and corals are necessarily of slow growth, because of the scantiness of the material with which they build. The sheets of coral on uplifted areas seem to be of nearly uniform thickness, approximating 100 feet. This is explicable from the habits of the coral animal, which does not grow at a greater depth than fifteen or twenty fathoms. Unlike merely sedimentary strata, the coral follows the topography of the rising surface along a contour of which it grew. Where muddy waters or frequent eruptions befoul the sea there are no coral reefs.

When the uplift began, say ten or twelve thousand years ago, the island shores were steep and the sea about them relatively deep, so that an upheaval of 100 feet added but little to the area of the Islands. As the amount of uplift increased to something approaching the mean depth of the circumambient sea the area of the Islands increased in a far greater ratio to the increment of upheaval. The last rise of 100 feet has rescued from the sea the most valuable part of the Archipelago. Examination of

the charts will show that a fresh rise of 100 feet would add a further area, which, though important, would be less so than the actual lowlands of the Philippines. The plateau on which the Islands stand is now mostly above sea level.

Area has also been added to the land by the formation of deltas at the mouths of rivers, a process which has been greatly assisted by the mangrove trees and the nipa palms. These grow in the water in all favorable situations, and hold back the solid contents of the streams, adding their own debris to the accumulation. Along the eastern shore of Manila Bay the so-called "estero" or "bayou" country consists of the confluent deltas of the various rivers flowing into the bay.

To the eastward of the estero country the ground passed over by General MacArthur's army from Manila to San Fernando consists of low, base-level terraces, all more or less dissected by water courses. These almost always have somewhat high and steep banks. They are, in fact, engorged, as is characteristically the case in a country undergoing upheaval; for upheaval increases the potential energy of the flowing water and leads to the erosion of the stream beds.

Many of the volcanoes in the Philippines have ejected ash or lava recently, or since the occupation of the country by the Spaniards. Many other cones are plainly volcanic of no ancient date. Beginning at the south, there is at the southern end of Mindanao a group of volcanoes, none of which is known to have been in eruption since January 4, 1641. On that date there was a disturbance in the Philippines which extended far and wide. It is alleged that three outbursts took place on this day in different portions of the Archipelago, accompanied by earthquakes, which were also felt in Cochin China and Cambogia. A Spanish squadron was off the south coast of Mindanao at the time and some of the ships were almost overwhelmed by volcanic ash.

The second eruption of January 4, 1641, is described as occurring near Joló. The report states: "And although, at the time, the darkness and atmospheric disturbance were so great that the people of Joló could not perceive whence came the stuff which fell from heaven upon them, yet when it became light it was observed that at the same time when the volcano burst forth at Sanguil, Mindanao, the elements there had also become excited, and that a second volcano had opened on a small island which lies opposite the bar of the chief river of Joló, where lies our military station. The crater of this volcano is still open." Semper and Jagor are of the opinion that such an eruption really took place, but no further outbreak is known to have occurred there, and it is not known that the remains of the crater have been described.

The third eruption on that same January 4 took place from what was called "a water volcano" by the agent of the Archipelago. The descrip-



tion makes it clear that by this term he had no intention of indicating thermal phenomena, but merely an outbreak of water accompanying what he himself called a frightful earthquake. This took place in Luzón among the Igorrotes. Three hills and several villages are said to have been thrown into the air in fragments. This locality is supposed to have been Mount Santo Tomás, or Tonglon, some 15 miles from Aringay, in the Province of Unión.

A group of volcanic cones exists a little to the northward of the Bay of Sarangani. They are extinct or dormant, so far as known. Mount Apo is the highest mountain in the Philippine Archipelago. It was ascended in 1880 by Mr. Montano and Governor Joaquín Rajal, who found the altitude to be 3,143 meters, or 10,311 feet, and in 1882 by Messrs. A. Schadenberg and O. Koch, who determined the height at 3,280 meters, equal to 10,761 feet. The cone is covered from about the 7,500-foot contour to the summit by a mantle of sulphur. An enormous crevasse in the flank of the mountain emits jets of sulphurous acid, which escape with a strident roar. Though Apo is well known to be active, there is said to be no record of its eruptions.

On the Island of Negros are two volcanic vents. One of these is a small affair, at the southern end of the island, some 10 miles from Dumaguete on the southeastern slope of the Cuernos de Negros. The volcano of Canlaon is in the central range of the island of which it forms a culminating point. It is visible from near Iloilo, and can be seen from vessels cruising on the eastern side of Cebú. It is a very impressive spectacle, for, in addition to the picturesque form of the cone, steam is always pouring from at least two vents at the summit.

According to Mr. Semper, extinct volcanoes exist in nearly all of the islands. In the Island of Leyte are two volcanic vents from which much sulphur has been gathered. The Island of Biliran is also well known for its sulphur deposits, which are the best in the Islands. In Panay a few warm springs seem to be the only present manifestations of volcanic activity. The southwestern portion of Luzón is famous for its volcanoes, both active and extinct. Of these the most southerly is Bulusán and its shape is strikingly like that of Vesuvius.

Mayón, or the volcano of Albay, is, next to Taal, the most famous Philippine volcano. It is possibly the most symmetrically beautiful volcanic cone in the world and at times its crater is almost infinitesimal. It has had a vast number of eruptions and there are recorded details of some twenty-seven, extending from 1616 to 1897. Some have been very destructive, as in 1814 about 1,200 lives were lost.

The Taal Volcano is a very peculiar one and is readily accessible from Manila. It lies on a small volcanic island in the Lake of Bombón. It has a relatively large central crater and several smaller extinct ones.

The main crater is nearly round and over a mile in diameter. Within its irregular rim are two hot pools, known respectively as the yellow and the green lake, and a little active cone about 50 feet in height from which escape steam and sulphurous gas. Taal has had some violent eruptions since the beginning of the Spanish occupation, the worst being in 1754. It consisted of fragmental ejecta, but these were sufficient to destroy four villages lying about the lake. This ash, says Semper, has now indurated and a new growth of bamboo and palms has sprung up around the projecting ruins. The eruption began, according to Bencuhillo, on May 15, and continued with intervals till December 1, when it ceased and a typhoon followed lasting two days, destroying all the volcano had left. In the Tropics nature has wonderful powers of recuperation. "In spite of the terrible lessons of the last century," comments Centeno, "all of these localities have been repopulated. Their fertility, their surpassingly beautiful topographical situation, and their unimprovable healthfulness charm the people into a prompt forgetfulness of past disasters. No great eruption has occurred since 1754. In 1808 and 1873 there were outbreaks, but the damage seems to have been confined to the island itself."

Mount Aráyat is a striking object, even from Manila Bay, 50 miles distant, looming up over an extensive plain in solitary grandeur. The merest glance is sufficient to show that it is a "monadnock" and in all probability of volcanic origin. There are two peaks, of which but one is visible from the south. It is densely wooded and shows no crater, and an examination of its structure shows it must have been extinct for a long time.

The remaining volcanic mountains of the Archipelago lie in one group at its northern end. In 1856 a new volcano made its appearance not far from Camaguín, at the Didica reefs of the Farallones. It appeared in September or October, 1856, between two rocks well known to the natives, at first as a column of "smoke." No earthquake attended its first appearance, but in 1857 it underwent a violent eruption attended by earthquakes. From that time to 1860 the volcano was constantly active and in four years had reached a height of 700 feet.

So large a portion of the Philippines consists of volcanic rock as to make it manifest that there must be in the Archipelago a considerable number of volcanic belts. Such zones form one of the most prominent features of Malaysia as a whole, and the volcanic structure of the Philippines must bear an interesting relation to that of the entire region. The Nicobar Islands, Sumatra, Java, and the little Sunda Group lie along the edge of a vast submarine precipice, or, in other words, at the very abrupt limit of the continental plateau. Some of the most active volcanoes of the world are here. Papandayang, in West

Java, had an eruption in 1772 which destroyed 40 villages. Galung Gung in 1822 destroyed 114 villages, and it is some measure of the violence of the Krakatoa explosion in 1883 that over 36,000 people perished. Off the west coast of the Philippines there is also a rapid deepening of the sea bottom, marking the eastern edge of the continental plateau, and here, too, there is a series of active and extinct volcanoes which stretches from Formosa to the Moluccas.

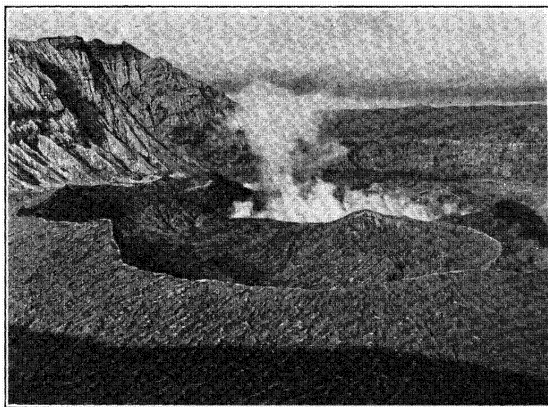
In the following table are collected the principal data available concerning 20 active and 29 extinct or dormant volcanic vents, with name, location, height, character of rock, and date of eruptions:

*Active and solfataric volcanoes.*

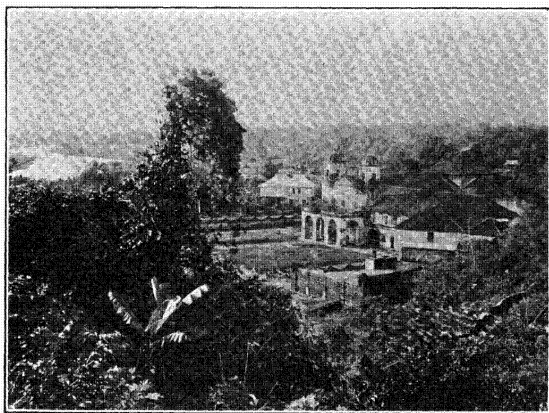
Name.	Locality.	Date of eruption.	Rock. <sup>1</sup>	Approximate—		Height.
				Latitude.	Longitude east of Greenwich.	
				° /	° /	<i>Fect.</i>
Babuyán Claro	Batanes	1831, 1860		19 30	121 56	
Camiguín de Babuyanes.	do	Solfataric		18 55	121 52	
Didica	do	1856 to 1860		19 02	122 09	700
Cagua or Caua	Cagayán	Solfataric in 1860		18 13	122 04	3,920
Taal	Batangas	1709, 1715, 1716, 1731, 1749, 1754, 1808, 1873.	Andesite <sup>2</sup>	14 02	120 57	1,050
Banájao or Majaijai	Laguna	1730	do <sup>3</sup>	14 02	121 27	7,382
Mayón or Albay	Albay	1616, 1766, 1800, 1814, 1827, 1835, 1845, 1846, 1851, 1853, 1855, 1858, 1868, 1871, 1872, 1873, 1881, 1885, 1886, 1887, 1888, 1890, 1891, 1892, 1893, 1895, 1896, 1897, 1900.	do <sup>2</sup>	13 16	123 39	8,970
Bulusán	Sorsogón	1852, solfataric		12 47	124 01	
Guinon (Bilirán Island).	Leyte	Solfataric	Andesite <sup>4</sup>	11 32	124 28	
Kasiboi or Caolangojan.	do	do	do <sup>5</sup>	10 55	124 53	
Danán	do	do	do <sup>5</sup>	10 54	124 53	
Alivancia	Paragua	do		10 30	119 48	
Talasiquin	do	do		10 30	119 48	
Canlaón	Negros Oriental.	1866, 1893	Andesite? <sup>6</sup>	10 25	123 06	8,192
Magasú	do	Solfataric	Andesite <sup>6</sup>	9 15	123 09	
Camiguín de Mindanao.	Misamis	1871, 1875	do <sup>7</sup>	9 12	124 42	1,950
Macaturin or Pollock or Sujut or Illano.	Cottabato	1765, 1856, 1865, 1871		7 36	124 26	
Apo Dávao	Dávao	Solfataric	Andesite <sup>8</sup>	7 03	125 17	10,311
Sanguil or Sangir (Balut Island).	do	1641		5 25	125 19	3,117
Joló	Joló	1641	Basalt? <sup>6</sup>	9 6 05	9 120 58	

<sup>1</sup> The queries indicate that the composition of the volcano is inferred from specimens collected near it but not on it.

<sup>2</sup> Oebbeke. <sup>3</sup> V. Drasche. <sup>4</sup> Abella. <sup>5</sup> Roth. <sup>6</sup> Becker. <sup>7</sup> Renard. <sup>8</sup> Velain. <sup>9</sup> Uncertain.

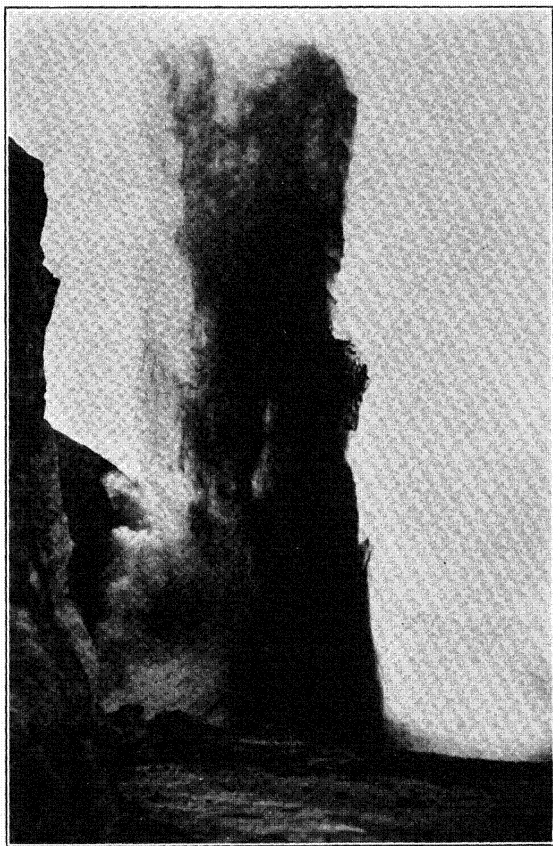


THE TAAL VOLCANO, BATANGAS PROVINCE.



TAAL, BATANGAS PROVINCE.





TAAL VOLCANO ERUPTION IN APRIL, 1903.



*Extinct or dormant volcanoes.*

Name.	Locality.	Rock.	Approximate—		Height.
			Latitude.	Longitude.	
			° /	° /	<i>Feet.</i>
Datá	Lepanto		16 57	120 55	7,364
Aráyat	Pampanga	Trachyte? <sup>1</sup>	15 13	120 42	2,880
Pinatubo	do	Andesite <sup>2</sup>	15 09	120 19	6,050
Butilao	Bataan	Andesite? <sup>3</sup>	14 43	120 21	4,376
Nagouliat or Mariveles	do	do <sup>3</sup>	14 31	120 26	4,678
Corregidor	do	Andesite, dacite <sup>3</sup>	14 23	120 32	640
Pico de Loro	Cavite	Andesite? <sup>3</sup>	14 13	120 36	2,270
Talim	Morong	Basalt <sup>3</sup>	14 20	121 13	1,519
Maquiling	Laguna	do <sup>4</sup>	14 08	121 10	3,724
Cristobal	do	Basalt? <sup>4</sup>	14 03	121 24	5,288
Malarayat and Sosoncambing	Batangas	Andesite? <sup>2</sup>	13 58	121 11	
Tombol	do	do <sup>2</sup>	13 49	121 10	
Ambil	Mindoro		13 48	120 16	2,500
Lobo	Batangas	Andesite? <sup>2</sup>	13 39	121 16	3,451
Labo	Canarines Norte	do <sup>1</sup>	14 01	122 46	5,092
Colasi	do	do <sup>4</sup>	13 58	122 59	
Isarog	Camarines Sur	do <sup>4</sup>	13 41	123 21	6,540
Iriga	do	Basalt, andesite <sup>1</sup>	13 26	123 26	3,976
Malinao	Albay	Basalt <sup>4</sup>	13 26	123 34	
Mazaraga	do	do <sup>4</sup>	13 18	123 35	4,442
Pocdol or Bacon	Sorsogón		13 05	123 54	
Mainit or Sapongan	Surigao		9 28	125 33	1,115
Cottabato or Taviran	Cottabato		7 06	124 18	
Cagayán, Joló	Balábac		6 59	118 30	
Magolo	Davao		6 19	125 06	
Matutum	do		6 11	125 06	
Malibato	do		6 08	125 02	
Butulan or Sarangani	do		5 42	125 18	
Balut or Sangail	do		5 24	125 20	3,117

<sup>1</sup> V. Drasche.<sup>2</sup> Oebbeke.<sup>3</sup> Becker.<sup>4</sup> Roth.

From the number of volcanoes both active and dormant in the Archipelago, the seismic foci are numerous, and, while there are some islands where earthquakes are infrequent, the major portion has been frequently visited with disturbances more or less serious. A map of seismic foci published by the Observatory of Manila, under the direction of the Jesuit fathers, gives ten different centers of earthquake activity, most of which bear an intimate geographical relation to the more prominent volcanoes of the Archipelago. They extend from the northern part of Luzón to the southern part of Mindanao.

Without entering upon any description of the different earthquakes that have been felt in the more remote parts of the Archipelago, many of which were local in their manifestations, nor attempting to give a list of all the disturbances that have been recorded for any one region, mention will be made of those which have been felt in recent times at Manila, and which for the most part are attributed to the focus of the Taal Volcano. Between the years 1870 and 1897, a period of twenty-seven years, this region has to its credit 157 earthquakes, of which 34 were merely perceptible, 95 were slight, 15 were moderately violent, and 13 were severe. The most violent was experienced in the month of July, 1880, when the Provinces of Manila (now Rizal), Cavite, Laguna, Bulacán, Pampanga, Nueva Écija, Pangasinán, and certain districts of Príncipe, La Infanta, and Morong were the theater of one of the most violent and destructive earthquakes recorded in the annals of seismic disturb-



ances in the Archipelago. Within the extensive zone formed by the provinces named the shocks were so violent that they either destroyed stone buildings or so injured them that they had to undergo important repairs.

The effects of this earthquake were visited not alone upon buildings, as the inhabitants of San Carlos in Pangasinán saw their rice fields destroyed, and at Cavite columns of what appeared to be ashes and water arose in the bay in front of the town, and gave off a decided sulphurous odor. In Nueva Écija there were extensive subsidences of land which caused extensive inundations. In the district of Infanta large rocks were loosened from the eastern side of the mountains, and in all the provinces named large crevasses opened in the ground, chiefly in the neighborhood of the rivers, the deltas, and upon the seashore.

All authorities agree to-day in the direct and immediate connection between earthquakes and volcanic phenomena; and that eruptions are due to steam tension. It is therefore of capital importance to know the chemical composition of the matter ejected by volcanic vents, as this gives an approximate idea of the amount of pressure or tension to which the steam is subjected before it can be relieved by escaping through some vent in the earth's crust. It is well known that acid lavas, such as rhyolites, have a much higher melting point than basic lavas, and therefore those volcanoes which eject acid lavas generally originate vibratory waves of greater force than those ejecting basic lavas. It will be noted that in the list of volcanoes given, the rocks of all Philippine volcanoes are trachyte, basalt, or andesite, indicating that, comparatively speaking, the internal pressure will find vent more easily or with less resistance and consequently with less serious disturbances than were they of other composition.

## Chapter III.

### MINERAL RESOURCES.

[Revised by F. A. Thanisch.]

Difference between lignite and coal—Lignite a valuable mineral—Distribution of lignite—Assays of Philippine lignite—History of coal mining—Distribution of gold—Prospectors and miners at work—Methods employed—Gold fields—Igorrote quartz mining—Placer mining—Platinum associated with gold—Copper—Native copper workings—Composition of copper ores—Galena ores—Magnetite—Metal work—Petroleum—Sulphur—Marble—Mineral waters—Mining legislation.

True (Paleozoic) coal does not exist, so far as known, in Malaysia. The nearest approach to it is the black, pitchy lignite similar to that of the State of Washington. The difference between lignite and true coal consists mainly in the quantity of combined water, which not only diminishes the percentage of combustible material but requires the expenditure of combustible constituents to convert it into steam or dissociated gases of the temperature of the flame. The black lignite is, perhaps, judging from our present knowledge of the mineral resources of the Archipelago, the most valuable mineral asset of the Philippines, and is widely distributed from southern Luzón southward. It is difficult to trace its distribution in detail, because there are also brown lignites of less value at many points, while the available reports are for the most part not sufficiently explicit to determine which fuel has been discovered.

The black lignite is probably of Eocene age, and is very similar to the Bornean or Javanese lignites, particularly to the fuel of Labuan, in North Borneo, well known throughout the Far East. The brown lignites of the Philippines probably correspond, both geologically and in quality, to the late Tertiary lignites of Borneo. The Japanese "coal" is also a lignite, and no better than the black fuel of the Philippines, which will serve admirably for all local purposes, and in case of need will answer for war vessels as well. Its heating power is approximately from two-thirds to three-fourths that of the best Paleozoic steam coals, such as the Cardiff.

Coal seams have been discovered and recorded in many localities in the Philippines. In the Island of Luzón concessions have been granted only in the extreme southeastern corner, in the Province of Albay, but Centeno

states that applications have been made for concessions in Tayabas, although no development work has been done. In the following localities in Luzón fossil fuel has been found: In Cagayán there is an outcropping at a bayou called Calbong; in Abra lignite is found on the River Malanas, in the township of Dolores; in Unión it occurs at Aringay; in the Province of Rizal there is lignite at Tatauiran Gulch and other points; in Camarines Sur lignite is found near Pasacao, on the southwestern coast, and also on the Caramuan Peninsula, which forms the eastern extremity of the province. The localities mentioned seem to lie at the edge of a field which stretches southward into Sámar and which is extremely promising. About 12 or 15 miles to the south of Catanduanes lie the small islands of Carraray, Batan, and Rapurapu. Here the lignite is black, resembling bituminous coal in appearance, and is of excellent quality. It is found in seams of good thickness and is close to tidewater.

The Batan coal appears to crop out at Gatabó, not far from Bacón, in the Province of Sorsogón. Among the seams is one from 4 to 8 meters in width which has been tried on steamers and found to be satisfactory. In the southeastern part of Negros coal seams occur lying 6 or 8 miles from the coast and in a line substantially parallel thereto. Cebú divides with Albay and Sorsogón the reputation of being the most important coal region of the Archipelago, and has been carefully examined by Mr. Abella. The coal occurs chiefly on the eastern slope of the central range between Dávao and Boljoón. The principal deposits are in the townships of Dávao, Compostela, and Naga. In 1899 the Compostela mines were being worked in a small way and coasting steamers depended upon them for their supply of fuel.

The existence of coal has been known to the natives for an indefinite period, and a mountain in the Naga district bears the name Úling, which is the Visayan name for coal. The Spaniards became aware of the coal deposits in 1827, but never worked any of the mines with energy or method.

While coal occurs in almost every township along the eastern coast of Cebú, Mr. Abella properly protests against speaking of the region as a coal basin. The strata are sharply flexed, folded, and faulted, the coal seams sometimes standing vertically, which makes careful investigation necessary before plans are entered upon to mine on an extensive scale. On the other hand, labor being cheap and the distance to the seacoast being but a few miles, the Cebú coal should be able to compete with Japanese or Australian coal in the Manila market and render a handsome profit. The seams are often 4 feet in thickness, and one at Compostela is over 8 feet. Tests of these coals have been made on Spanish war vessels and under boilers at the arsenal at Cavite with satisfactory results. The following tables show analyses of Philippine, Japanese, and Australian

coal and give a good idea of the comparative merits of the different classes:

TABLE I.—*Coal analyses, Bureau of Government Laboratories, 1902-3.*

Locality.	Water.	Volatile com-bustible matter.	Fixed carbon.	Ash.	Iron.	Sulphur.	Phos-phorous.
Philippines -----	18.50	37.73	38.10	5.66	0.48	0.87	-----
Lignites -----	5.00	42.21	49.70	3.08	.52	.22	0.05
Alpacom, Cebú -----	13.35	42.20	43.73	.71	-----	-----	-----
Davao, Cebú -----	8.96	35.11	52.92	3.00	-----	-----	-----
Compostela, Cebú -----	8.83	35.10	52.78	3.28	-----	-----	-----
Mount Uling, Cebú -----	9.30	39.24	48.64	2.81	-----	-----	-----
Do -----	17.30	44.51	31.67	3.52	-----	-----	-----
Zamboanga, Mindanao -----	4.64	38.38	55.19	1.78	-----	-----	-----
Surigao, Mindanao -----	17.37	41.80	33.44	7.38	-----	-----	-----
Montelban -----	1.75	38.19	47.87	12.18	-----	-----	-----
Western Negros -----	21.20	40.80	31.50	6.50	-----	-----	-----
Calatrara, Negros -----	19.33	32.37	39.91	8.39	-----	-----	-----
Kabanklan, Negros -----	15.03	33.50	44.67	6.79	-----	-----	-----
Japanese coal -----	2.38	38.27	52.58	6.77	.33	.21	.32
Do -----	2.10	38.10	45.90	13.90	-----	-----	-----
Do -----	1.71	25.53	67.06	5.70	.42	1.07	.14
Australian coal -----	2.00	32.60	56.60	8.80	-----	-----	-----
Do -----	2.47	32.15	58.20	7.17	.24	.22	.66

TABLE II.—*Coal analyses from the Coal Measures of the Philippines, 1901.*

Locality.	Water.	Volatile com-bustible matter.	Fixed carbon.	Ash.	Calories.
Leyte Island -----	0.55	48.35	47.975	3.125	5,800
Cebú Island -----	24.45	23.44	41.90	10.21	5,053-6,146
Do -----	18.162	24.238	48.250	9.350	5,217
Do -----	22.388	27.632	45.660	4.320	5,487
Do -----	16.898	29.902	46.500	6.700	5,680
Batan Island -----	13.10	34.15	45.53	7.22	5,206
Do -----	13.84	35.46	46.82	3.88	5,687
Do -----	13.32	38.68	44.78	3.22	5,540
Do -----	14.20	37.70	42.50	5.60	5,536
Do -----	13.40	38.54	44.96	3.10	5,513
Uling, Cebú -----	6.30	35.30	53.55	4.45	-----
Australian -----	2.90	16.25	71.45	9.40	-----

But little is known of the coal of Leyte, Mindanao, and the adjacent islands beyond the fact of the existence of certain deposits which have been located. While it seems reasonable to class all Visayan coals as Eocene, because of their composition and the stratigraphical relations in Cebú and Negros, the same assumption is not justified in Mindanao because of lack of knowledge. It would be in no way surprising, however, to find the coals of eastern Mindanao similar to those of Leyte, which is clearly a continuation of the Surigao Peninsula.

The past history of coal mining by the Spaniards is a long record of ignorance, avarice, and mistakes. They attempted to mine coal as though it were a precious metal, and indeed it became equivalent to it in some instances when measured by the cost of production. At one time the government was so impressed with the value of this industry that it was for a while a monopoly in which the government was interested, but as a business venture it was not a success. On the whole, the coal deposits of the Archipelago offer opportunities for investment which may well invite

thorough investigation, and, should they be developed on an extensive scale, will soon solve the fuel and power questions which at present are prominent among the serious problems confronting those interested in the development of the rich virgin resources of the Archipelago.

Gold is found in many localities in the Archipelago in regions extending from northern Luzón to central Mindanao. In most cases the gold is detrital and found either in existing water courses or in stream deposits now deserted by the current. These last are adapted to hydraulic mining. There has been no gold mining, properly so called, in the Archipelago up to the present time. The mining regions have never been thoroughly prospected, and even where valuable deposits are known to exist they are worked, if at all, in a haphazard and intermittent manner. The indications now are that the near future will inaugurate a great change in the mining industry.

There are at present many prospectors and practical miners scattered throughout the different islands of the Archipelago, the larger percentage of whom are Americans. They are for the most part men of good character. They are pushing their way into the more inaccessible regions, furnishing their own protection, and are prospecting in a manner and to an extent never before paralleled in the history of the Philippine Islands.

There is no doubt that mining for the precious metals was practiced in the Islands long before the advent of the Spaniards. It is quite probable that the alluvial deposits, accessible to the early Chinese and Malay traders, who had intercourse with the Islands long before they were known to the Europeans, have been to a great extent worked over and over again. The tools which the natives use—a washing board and a wooden bowl—are of great antiquity. Boulders and fragments of quartz with visible gold occur in many alluvial deposits in the Islands, and it is not likely that the natives would have thrown them aside without endeavoring to extract the gold. Their method is to pulverize the quartz by hand and wash it as they wash the auriferous gravel and sand.

The only improvement in this rude process is the introduction by the Spaniards in some districts of the Mexican "arrastra," a block of rock moved by buffalo power like a millstone on a nether block. Float gold and auriferous pyrites are lost by this process, and it is doubtful whether to this day the natives are aware of the auriferous character of the pyrites which almost always accompany the auriferous quartz, sometimes in not inconsiderable proportions.

The most important gold fields are three in number. The most northerly lies about Mount Data, in the country of the Igorrotes. The second and best-known district is that of Camarines Norte, about 115 miles southeast of Manila and accessible by sea. The third region is in the northeastern part of Mindanao and the adjacent small islands. The

following note on gold in Luzón was compiled by Mr. Luis Espina from the records of the Inspección de Minas in Manila, of which he was in charge in 1898:

Gold is found in moderate quantities nearly all over the Island of Luzón, but more particularly and under conditions favorable for exploitation in the following townships and districts, proceeding from north to south:

1. Abra Province.
2. Village named Fidelisan, Bontoc Province.
3. Village named Suyuc, Lepanto Province.
4. Village named Tubuc, Lepanto Province.
5. Village named Dugon, Lepanto Province.
6. Village named Acupan, Benguet Province.
7. Village named Tabio, Benguet Province.
8. Village named Capunga, Benguet Province.
9. Village named Itogon, Benguet Province.
10. Village named Gapan, Nueva Ecija.
11. Village named Peñaranda, Nueva Ecija.
12. Village named Paracale, Ambos Camarines.
13. Village named Mambulao, Ambos Camarines.
14. Village named Labo, Ambos Camarines.
15. Village named Capalongan, Ambos Camarines.
16. Village named Maculabo, Ambos Camarines.

In the Province of Abra gold is found in alluvial deposits, and in the sands of the river of the same name, as grains, and has an average fineness of 0.750 to 0.792. In the Province of Lepanto gold occurs in three different ways—in veins, in alluvial deposits, and in river sands. Its fineness is from 0.792 to 0.833, and it is somewhat light colored because of a considerable silver content. It is usually accompanied by ores of silver, copper, iron, and lead. In the Provinces of Bontoc and Benguet the deposits are in all respects analagous to those of Lepanto. In the Province of Nueva Ecija the gold is exceedingly pure, brilliant in color, and 0.958 fine. It is found as rounded particles in alluvium and sometimes in small crystals.

The Igorrotes, who inhabit Abra, Bontoc, Lepanto, and Benguet, are extraordinarily reticent about their gold mining. Nearly two hundred years ago Morga wrote that the "Yglotes" would not permit the Spaniards access to the mines. Even Semper, who was on intimate terms with the Filipinos, was not allowed to visit any gold mines in the Cordillera Central. An Englishman of long residence in northern Luzón, who had handled much Igorrote gold commercially, states that no outsiders of any race were permitted to visit quartz mines or even to prospect for quartz, though they were sometimes allowed to wash gravels in the streams of the Agno and the Abra River basins.

The Igorrotes themselves are gifted with mechanical skill and are not afraid of solid rock, and it is to be inferred that their quartz mining, though crude, is tolerably effective. The great topographical accentuation of their country favors tunnel drainage and must enable them in many cases to dispense with pumping or bailing. This northern field, as noted, lies in a region of crystalline schists and older massive rocks, and there

is no known indication that neo-volcanic rocks are associated with the quartz veins so as to lead to the hypothesis that the gold deposits are related to these eruptions. Indeed, throughout the Archipelago the geological phenomena point to an age at least as great as the Mesozoic for the greater part of the gold.

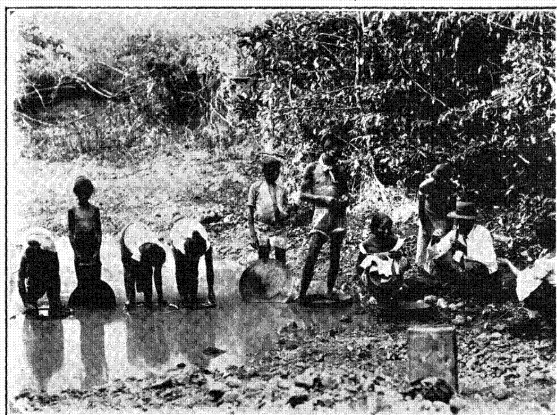
The gold district of Camarines Norte is also in the gneissic rocks. Here are found quartz veins carrying, besides gold, iron pyrite, copper pyrite, galena, zinc blende, and sometimes lead chromate. At Labó, Centeno mentions that native copper is sometimes observed in the veins, and Morga states that the gold is alloyed with the copper. The general direction of the veins in this region is north and south except those of Gumiham, and of Mount Lugas, which trend northwest. They are approximately vertical, and their width is from 1 to 5 inches, though at some points they are much wider, reaching to 3 or 4 hands (palmas), but in such cases they become poor in the precious metal. For pulverizing the ore the natives employ a species of trip hammer made by attaching a heavy stone to a sapling. A second stone answers for an anvil. After placing the quartz on the nether stone the workman pulls down the head, the elasticity of the sapling raising it again for another blow. The quartz crushed in this manner is ground in an arrastra, concentrated in a batea, and washed clean in a cocoanut shell.

There are also numerous placer mines in this region, but they are not especially rich. Beach sands are also washed, and it is reported that gold is found in the wall rocks as well as in the veins, but this statement is doubted by careful observers.

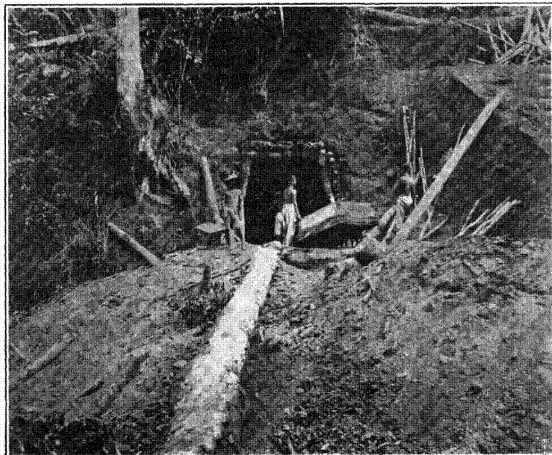
In Panay Mr. Abella gives a number of localities where gravels have been washed for gold which is known to exist at San Enrique and at Baróto Viejo, in the Province of Iloilo. In Cebú there are old workings, and also at Pambujan on the Island of Sámar. On the Island of Panón, south of Leyte, there are mines of auriferous quartz that have yielded \$6 or \$7 per ton.

The mystery of the unknown still hangs about Mindanao, though something has been recorded concerning its mineral resources. The known auriferous regions are two; one of them lies immediately south of the Bay of Macajalar on the north coast in the Province of Misamis; the other comprises the eastern coast range of the island in the Province of Surigao, but is only known to contain gold in promising quantities near the northern end of the range. Of the two districts, that of Misamis is the more famous.

These auriferous deposits include veins, placers, and river sands. The veins, however, have been worked only to a limited extent in former times, either from lack of knowledge of that class of mining or lack of adequate machinery to treat the ore on an extensive scale. But little gold is secured from the river beds. The placers lie near the



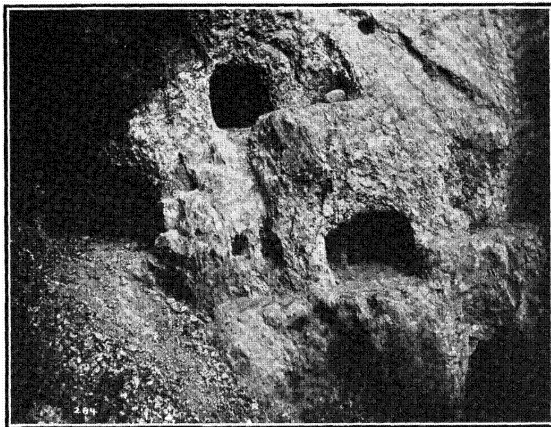
GOLD PLACER MINING IN NUEVA ECJA.



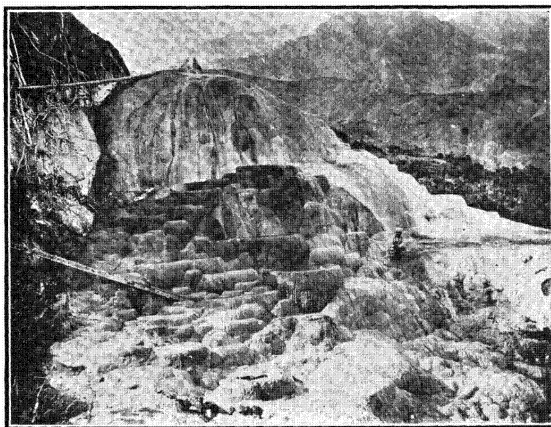
ENTRANCE TO COAL MINE, ISLAND OF BATAN.





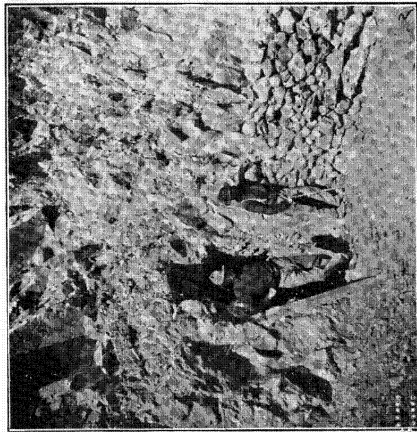


IGORROTE MINES, BENGUET PROVINCE.

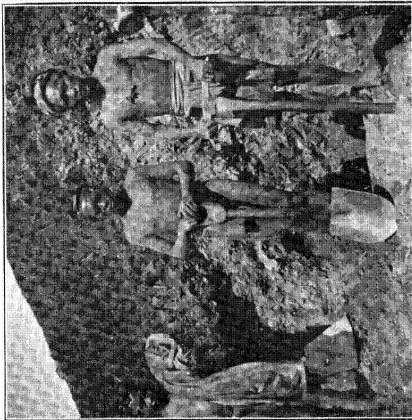


SALT SPRINGS, BENGUET.

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PROSPECTING IN BENGUET.



IGORROTE MINES IN BONTOC.



rivers, but at some distance above them. The four rivers emptying into the Bay of Macajalar are flanked by placers on either side. The most important is the Iponan and the gravels are scattered along it for a distance of 12 miles. On the tributary Bitog of the Rio Cagayán (not the great river of the same name in Luzón), there are gravels for about 2 miles. There is one placer on the Bigaan and two on the Cutman. There is also one locality where gold-bearing quartz is found which is close to the Cutman near the town of Agusan.

Along the Iponan the gravels are found at an elevation of about 66 feet above the river. They are not continuous, but occur in patches, the local conditions showing that the intermediate areas have been removed by erosion. They rest on marls or conglomerates, and the miners distinguish three layers—black, grass-root soil; red, plastic clay; and the pay streak (*dugcálon*). This last consists of sand quartz, pebbles of porphyry, and of magnetite. The pay streak seems to average about  $5\frac{1}{4}$  feet in thickness. The placers of the other river basins are quite like those of the Iponan, the gold from Cagayán being a little finer than that from Bigaan and the Cutman a little baser.

The remarkable fact pointed out by Mr. Minard, that the Misamis gravels contain platinum as well as gold, a statement confirmed by Mr. Espina, may lead to important results. The reported presence of this rare metal induced the Mining Bureau of the Philippine Government to issue a bulletin giving information to prospectors and placer miners as to the methods for detecting the presence of platinum and its associated metals, iridium and osmium, all of which are as valuable or more valuable than gold. As platinum is found in the placer gravels of the neighboring Island of Borneo, its presence in Mindanao is not improbable. With these metals frequently occur chromite, corundum, zircons, rubies, and diamonds, and as Burma on the Malay Peninsula is the greatest ruby producer in the world, it would not be surprising if these beautiful and valuable gems should be discovered in Mindanao. The interior of the island has never been prospected, and time alone will reveal what mineral treasures may be confined within the interior highlands. There are other districts in the Philippines where gold has been discovered and worked in a primitive way, though nowhere in all the Archipelago has modern machinery and scientific methods been given a thorough test. As many of the prospectors now at work in the Philippines are practical men, trained to their work by years of experience among the mountains of the western part of the United States, it will not be long until the auriferous value of the country will be demonstrated. That the Spaniards never developed any valuable gold mines is no argument against their existence, for while they were remarkably successful

in dealing with silver ores, they were never able to successfully handle the gold-bearing quartz in Spanish America.

Copper ores are reported from a great number of localities in the Philippines. They are said to occur in Luzón, Mindoro, Panay, and Mindanao. It is not probable that all of these are important, but northern Luzón contains a copper region of unquestioned value. The best-known portion of this region lies about Mount Data, in the Province of Lepanto. The range of which Data forms a part trends due north of Cape Lacay-Lacay. In this range copper was smelted by the natives long before Magellan discovered the Philippines. The process consists of alternate partial roasting and reductions to "matte," and eventually to block copper. It is generally believed that this process must have been introduced from China or Japan. It is practiced only by one peculiar tribe of natives, the Igorrotes. This tribe is in most respects semibarbarous and lives in great squalor, though industrially they stand on a high level, and show remarkable skill in the working of metals as well as in their extraction. They have turned out not merely implements of small dimensions, but copper kettles as large as  $3\frac{1}{2}$  feet in diameter.

From 1840 to 1855, according to Santos, as much as 20 tons of copper utensils and ingots were exported annually by the Igorrotes. It was this trade which drew the attention of the Spaniards to this region. Vague reports and the routes by which the copper comes to market indicate that there are copper mines in various portions of the Cordillera Central, but the only deposits which have been examined with care are those of Mancayan (about 5 miles west of Mount Data) and two or three other localities within a few miles of Mancayan. These deposits are described as veins of rich ore some 7 meters wide and arranged in groups. Mean assays are said to show over 16 per cent of copper. The gangue is quartz. The country rock is described as a large quartzite lens embodied in a great mass of trachyte. The Mancayan deposit appears in a deep ravine called Fabio or Magambang, on the south side of Mount Aban, one of the western spurs of the great Data. At this locality there is a quartzose mass in a vertical position not more than 80 or 100 meters in thickness which strikes northwest and is exposed at the southeast by a great cut, partly due to the mining operations of the natives. The cappings are of columnar form and the whole mass is fissured or jointed in different directions, though the principal ore-bearing fissures strike WNW.

Mr. José Maria Santos, who reported on these mines in 1862, states that the ores are tetrahedrite, both antimonial and arsenical, chalcopyrite, chalcosite, bornite, the black oxide, and other oxidized or carbonated species, as well as iron pyrite. Comb or ribbon structure is common and the proportion of the various cupriferous minerals is very variable. He

made an effort to avoid the tendency to select rich specimens in sampling and gives the following as the mean composition of the different ore breasts of the native workings:

*Mean composition of the ore breasts of the native Mancayan copper workings.*

	Per cent.
Copper .....	16.64
Silica .....	47.06
Sulphur .....	24.44
Antimony .....	5.12
Arsenic .....	4.65
Iron .....	1.84
Loss .....	.25
Total .....	100.00

But little is known about the other copper deposits of the Philippines. There is a deposit near Antimonan, in Tayabas Province, and another in Camarines Norte, while d'Almont's map notes two localities in Camarines Sur where copper has been found. In the Island of Masbate native copper was discovered in 1847. In the Island of Marinduque the Guía Oficial states that copper occurs, but nothing further is known of the locality. At Lubang, on the Island of the same name, Dana found copper pyrite, probably only as an accompaniment of the gold, and indications have been noted at a number of other places, but practically nothing is known as to values.

Galena is found in Camarines Norte in the area of the crystalline schists accompanying other sulphurets and gold. Concessions have been granted for lead mining at a mountain called Tingá, near Paracale, and at a small hamlet named Imbong-inmong, in the barrio of Mambulao, but these ores were worked only for the gold. Centeno reports that the Tingá occurrence is very rich, but the veins are only from 3 to 10 centimeters in width. Paracale and Mambulao have a reputation among mineralogists as a source of lead chromate and vauquelinite. The deposit near Paracale is in a gneiss hill ten minutes' walk from the village of Malaguit, and the other is a mile and a half northeast from Mambulao, in the plumbiferous mountain Dinianan, which is composed of hornblende-schist. Roth states that the chromate is found in quartz veins and is accompanied by vauquelinite, like the occurrence in the Ural Mountains. Caramuan, in Camarines Sur, is credited with lead ore in the Guía Oficial, but it is probably associated with the copper deposits of that district.

In the Island of Marinduque, Province of Mindoro, at Torrijos, there is a lead deposit regarded by Mr. Espina as important. The assays are said to give, for average ore, 56.65 per cent lead, 0.0096 per cent silver, and 0.00096 per cent gold.

Cebú contains lead ores upon which Mr. Abella has reported as follows:

The most important metalliferous deposits, and indeed the only ones which deserve the name, yet discovered in the island are those of gold and silver



bearing galena. They lie toward the center of the island, at Panoypoy, barrio of Consolación, and at Aesubing and Budlaan, in the barrio of Talamban, the first two being those which give rise to the claims of the company known as *Le Cebuana*. The deposits all consist of bunches, veins, and stringers of pyritous galena, which form an irregular network in the rock complex of the eastern area of the interior of the island. They lack system or regular direction, and form there a true *Stockwerk*.

Centeno found the ore extremely rich in silver and gold, but for some unknown reason mining seems to have been abandoned. While in Mindanao Mr. Espina saw specimens of lead ores, but was unable to ascertain from whence they came. Argentiferous lead deposits of that island are yet to be discovered.

Something like a belt of magnetite exists among the mountains lying to the east of the great plain of Luzon. The northern part of this belt is 12 or 15 miles to the eastward of San Miguel de Mayumo on the headwaters of the stream which passes through the place. In this neighborhood the positions of four mines are indicated on d'Allmonte's map. A few miles southeast from this group lies a second, about 10 miles northeast of Angat. Here also four mines are shown, and this district has the reputation of possessing the most valuable iron ores in the Archipelago. At a similar distance to the northeast of Borsoboso another iron mine has been worked, and 10 miles northeast of Mórong there is still another mine. All of these deposits are in the foothills of the range which forms the western boundary of the district of La Infanta and at nearly equal distances from the crest. The belt is 40 miles long and evidently stands in genetic relations to the range. According to assays made by the Inspección General de Minas, the Angat ores carry from 60 to 70 per cent of iron.

In Camarines Norte there is a mine of magnetic iron ore about six miles south of Paracale on the Malaguit River. The natives work the ores of Angat and San Miguel de Mayumo, and the product is chiefly worked up into plowshares, which bring a much higher price than those imported from Europe. The process of treating the ore is probably similar to that employed in Borneo, where ironsmiths still manufacture excellent blades which the natives prefer to those of European manufacture, as experience has taught them that both the keenness of edge and durability are superior to any that can be found in imported blades.

Efforts have been made both by Spaniards and other Europeans to work these ores on an extensive scale, but, owing to the interference of the Government and the difficulty of obtaining suitable labor, all these efforts have come to grief, and at present nothing is done save by the natives, and that in a crude manner and on a small scale.

Among the more miscellaneous mineral products of the Archipelago, the value of which must depend upon future investigation and develop-

ment, may be mentioned petroleum, which has recently been discovered in the Islands of Panay, Cebu, and Leyte. In Panay it is found at Janiway, in the Province of Iloilo, and is accompanied by natural gas; in Cebu it is found on the west coast of Asturias, Toledo, and Alegría; in Leyte in the barrio of San Isidro—but in none of these places have serious efforts been made to extract, refine, or utilize this valuable fuel and illuminant. It is to be regretted that more specific information concerning these regions is not available.

Sulphur has been extracted under concession only at Biliran, but the volcanoes of the islands afford endless opportunities for exploitation all the way from Mount Apo in Mindanao to the volcano of Cagua near the northern extremity of Luzón.

Excellent marble is found on the Island of Romblón to the north of Panay, and it has been employed in the manufacture of baptismal fonts and other interior ecclesiastical decorations.

#### THE MINERAL WATERS OF THE PHILIPPINE ISLANDS.

In a country of as marked volcanic character as the Philippine Islands, thermal springs are to be expected, and we find that for ages certain springs have enjoyed great reputation on account of their medicinal value. Both hot and cold springs are found in various parts of the Archipelago and some of them have an undoubted claim to great medicinal properties. Among these the hot springs at Los Baños, in Laguna Province, Luzón; the Sibul Springs of San Miguel de Mayumo, Bulacan Province, and Tivi, Albay Province, Luzón, were perhaps the most celebrated, and from at least two of these the results obtained under American control fully warrant the high reputation they enjoyed.

Mineral waters may be roughly divided into (1) chalybeate; (2) saline; and (3) sulphuretted waters. So far none have been found of the first group, although the Spanish doctors have so classed several well-known springs; of the last two groups, however, numerous springs are in existence. To the second group belong all the springs at Los Baños and some of the springs in Benguet Province, as well as the San Rafael and Santa Matilda springs at San Miguel de Mayumo, and some of the springs at Mainit, Bontoc. As the resources of these Islands become better known and investigated this list will be, without a doubt, greatly enlarged.

The springs at Los Baños have been found of great value by the military authorities in the treatment of scrofulous affections, and this resulted in the establishment of a hospital there for the systematic use of these waters. Likewise those at San Rafael and others at Sibul have been used with excellent results, although since the American occupation they have fallen to some extent into disuse.

In addition to these well-known springs there are to be found a

large number whose value has been known only to the natives in the immediate vicinity, but which warrant a careful investigation and correct analysis. Owing to the very unsettled state of the country where these waters are mostly to be found little attention has so far been paid to this form of natural resources, but a gratifying change is beginning to be noticeable, and it will be only a question of time when these Islands will probably become the exporters of more varied and valuable mineral waters than Japan.

Under Spanish rule only a few of these waters were analyzed, and under the new régime only a slight beginning has been made in this direction, but enough has been done to remove the matter from the realm of empiric speculation and place it on a firm scientific basis. Tables here shown, indicating the work done, will greatly aid in placing this matter in a compact form for comparison.

### 1. *Chalybeate waters.*

[Analysis made by Spanish Government chemists of the San Jose Spring, San Miguel de Mayumo.]

	Parts per million.
Total residue .....	481.000
Free ammonia ( $\text{NH}_3$ ) .....	15.408
Chlorine (Cl) .....	37.537
Silica, ( $\text{SiO}_2$ ) .....	12.200
Sulphuric acid ( $\text{H}_2\text{SO}_4$ ) .....	24.034
Iron oxide ( $\text{Fe}_2\text{O}_3$ ) .....	15.200
Aluminium oxide ( $\text{Al}_2\text{O}_3$ ) .....	6.800
Calcium oxide (CaO) .....	190.400
Magnesium oxide ( $\text{MgO}$ ) .....	36.210
Sodium oxide ( $\text{Na}_2\text{O}$ ) .....	20.561
Carbonic acid ( $\text{CO}_2$ ) .....	357.960

### 2. *Saline waters.*

[A, San Rafael; B, Santa Matilda, San Miguel de Mayumo; C, Bilain; D, San Mariano, Norzagaray, Bulacan; analyses made by Spanish Government chemists. E and F, from two springs near San Miguel, Camarines; G, from near Bued River, Benguet; H, 1 mile above; I, 3 miles above; J, from above; K and L, from near Twin Peaks, Benguet; E to L, inclusive, from analyses by the Government Laboratory. All figures are in parts per million.]

	A.	B.	C.	D.
Fixed residue .....	472.00	574.00	7,346.00	1,066.00
Free ammonia ( $\text{NH}_3$ ) .....	32.67	31.32	25.64	25.00
Iron oxide ( $\text{Fe}_2\text{O}_3$ ) .....		12.40	2.60	5.60
Aluminum oxide ( $\text{Al}_2\text{O}_3$ ) .....		23.20	161.20	6.00
Calcium oxide (CaO) .....	208.46	180.66	1,162.67	213.92
Magnesium oxide ( $\text{MgO}$ ) .....	22.69	53.89	270.16	30.02
Sodium oxide ( $\text{Na}_2\text{O}$ ) .....	22.71	43.45	2,222.97	208.35
Potassium oxide ( $\text{K}_2\text{O}$ ) .....	2.13		25.04	
Chlorine (Cl) .....	29.75	53.68	4,300.57	418.58
Sulphuric acid ( $\text{H}_2\text{SO}_4$ ) .....	7.05	15.11	45.66	13.05
Silica ( $\text{SiO}_2$ ) .....	26.68	14.60	10.40	19.60
Carbonic acid ( $\text{CO}_2$ ) .....	420.40	531.67	221.68	424.00
Hydrogen sulphide ( $\text{H}_2\text{S}$ ) .....	1.17	1.95	32.46	1.62

NOTE.—Those above are also classed as sulphuretted, but in proportion to other constituents they seem to come in this group.

## 2. Saline waters—Continued.

	E.	F.	G.
Fixed residue .....	308.00	366.00	
Total residue .....		450.00	320.00
Loss on ignition .....	414.00	84.00	
Free ammonia (NH <sub>3</sub> ) .....	106.00	Trace.	
Iron oxide (Fe <sub>2</sub> O <sub>3</sub> ) .....	1.98	3.83	
Alumina oxide (Al <sub>2</sub> O <sub>3</sub> ) .....	.46	7.06	
Calcium oxide (CaO) .....	64.60	61.20	71.90
Magnesium oxide (MgO) .....	35.80	35.40	4.90
Sodium oxide (Na <sub>2</sub> O) .....	63.20	49.50	
Chlorine (Cl) .....	17.70	17.70	
Silica (SiO <sub>2</sub> ) .....	128.20	128.40	
Sulphuric acid (H <sub>2</sub> SO <sub>4</sub> ) .....			
Carbonic acid (CO <sub>2</sub> ) .....	(1)	(1)	
Hydrogen sulphide (H <sub>2</sub> S) .....			2.07

	H.	I.	J.	K.	L.
Total residue .....	1,447.00	347.00	563.00	294.00	271.00
Calcium oxide (CaO) .....	197.00	109.00	141.40	71.10	37.00
Magnesium oxide (MgO) .....	4.30	20.90	17.30	7.10	5.50
Chlorine (Cl) .....	1,038.00		Trace.	Trace.	
Hydrogen sulphide (H <sub>2</sub> S) .....	.65	.96			4.67

<sup>1</sup> Small amount.

## 3. Sulphuretted waters.

Of the last type of waters there exist several of marked medicinal value, but no complete analyses are available. The following three analyses made by the Government Laboratory for special purposes show some of the constituents of waters (A) from near Bued River, (B) from above Twin Peaks, and (C) from near Twin Peaks, all in Benguet Province:

	A.	B.	C.
Total residue .....	1,556.00	355.00	341.00
Calcium oxide (CaO) .....	180.00	101.00	85.70
Magnesium oxide (MgO) .....	3.20	3.60	11.90
Sodium oxide (Na <sub>2</sub> O) .....			
Chlorine (Cl) .....	460.00	Trace.	
Hydrogen sulphide (H <sub>2</sub> S), c. c. per liter .....	12.10	17.40	7.32

There exists still a fourth class of waters, which it seems almost improper to call mineral. These are waters noticeable by the almost total absence of constituents, both mineral and organic, and whose value lies in their great purity which fits them for use as table waters. Of this type no doubt many exist, but at this time only one can be given; it is from the Bued River spring in Benguet and has been analyzed by the Government Laboratory.

	Parts per million.
Total residue .....	49.30
Fixed residue .....	30.00
Loss on ignition .....	19.30
Sulphuric acid (H <sub>2</sub> SO <sub>4</sub> ) .....	7.97
Free ammonia (NH <sub>3</sub> ) .....	Trace.
Calcium oxide (CaO) .....	Trace.
Magnesium oxide (MgO) .....	Small amount.
Silica (SiO <sub>2</sub> ) .....	Small amount.
Chlorine (Cl) .....	Trace.
Carbonic acid (CO <sub>2</sub> ) .....	Trace.

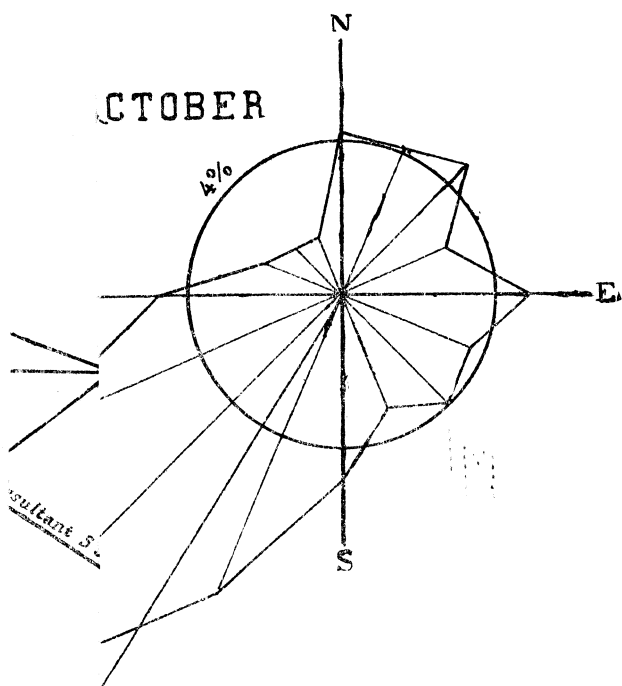
In conclusion, there being no good analysis of any of the springs at Los Baños available, it may be of interest to insert here the analysis made at the Government Laboratory of the deposit left on the stones at the outlet of these springs, which represents the deposit of the less soluble, therefore less active, medicinal constituents. The active soda and potash salts, to which these springs owe their main value, have been, of course, carried away, but the presence of more than 7 per cent of sodium sulphate is at least suggestive of the great amount which must be present in these waters to admit of this much being deposited.

	Per cent.
Water ( $\text{H}_2\text{O}$ )	2.74
Alumina ( $\text{Al}_2\text{O}_3$ )	35.82
Iron oxide ( $\text{Fe}_2\text{O}_3$ )	3.09
Silica ( $\text{SiO}_2$ )	49.04
Sodium sulphate ( $\text{Na}_2\text{SO}_4$ )	7.27

The importance of enacting legislation, under the provisions of which it would be possible for prospectors, miners, and others to secure and perfect title to their discoveries, was early recognized by the Philippine Commission, and at its urgent request Congress enacted a law which was approved July 1, 1902, entitled "An act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," which appears as Appendix G, page 405. Attention is invited to sections 20 to 62, inclusive, thereof, which include a comprehensive mining code. The system provided for by this act differs from that in effect in most of the States of the Union in that under the Philippines Act the holder of a mineral claim, while entitled to all minerals which may lie within his claim, is not entitled to mine outside the boundary lines of his claim continued vertically downward. In most of the States the holder of a claim is limited in his operations to veins or lodes having their apex within his boundaries, but is entitled to follow the drift of such vein or lode to any depth, regardless of the fact that they pass outside his vertical side lines.

The Philippines act also provides that no person or corporation shall own more than one mineral claim on the same vein or lode. This provision has met with strenuous opposition and criticism on the part of practical miners and others. It is contended that no development work on a large scale can be undertaken or expected with simply one claim as a basis. This is also the view taken of the matter by the Philippine Commission, and the desirability of removing this restriction has been urged upon Congress.

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## Chapter IV.

### CLIMATE AND HEALTH.

[Revised by Rev. Father José Algué, S. J.]

Variety of climate—Healthfulness—Smallpox—Vaccination—Cholera—Bubonic plague—Leprosy—Leper colony—Other diseases—Health of the Army—Characteristic conditions of weather in Manila—Development and course of the storms and cyclones in the Archipelago—Care of health in the Tropics—Climate of high table-lands—Temperature of Benguet—Humidity of the atmosphere—Improved tropical sanitation.

Almost any general statement concerning the climate and health conditions of the Philippines is untrue, as the Islands extend from a point 325 miles north of the equator to almost 1,500 miles from that parallel. The southern extremity of the Archipelago is in nearly the same latitude as Singapore, while the northern part is as far from the equator as Calcutta in India or Santa Clara, Cuba. While lying wholly within the torrid zone, it is only Joló and Minadano that have an equatorial climate, while Luzón, reaching almost to the Tropic of Cancer, has a tropical climate. Altitude also exerts a greater influence on temperature than latitude, and while the cities and towns on tide water suffer from the debilitating influence of heat and humidity, the highlands of the interior enjoy a clear, cool, bracing climate.

The climate of the Philippines as a whole is tropical. It is the recorded opinion of the Philippine Commission that no tropical islands in the world enjoy a better climate than do the Philippines.

To speak more in detail, the following abstract of a work recently published by the Manila Observatory will give an idea of the most important features of the weather in Manila and of the development and course of the storms and cyclones in the Archipelago:

#### CHARACTERISTIC CONDITIONS OF WEATHER IN MANILA FOR EACH OF THE TWELVE MONTHS OF THE YEAR.

##### JANUARY.

*Atmospheric pressure and perturbations corresponding to the month of January.* The normal barometric pressure of January, as deduced from 1883 to 1898, is 761.27 mm. (29.97 inches). The atmospheric perturbations of January are of very little importance for Luzon, though not so with regard to the Marianne and Caroline Islands, and the large island of Mindanao. These January disturbances originate, nearly all of them, in the Pacific Ocean, and their general path is



along one of the two following directions. Some develop far to the southeast of Manila beneath the tenth parallel, and, moving in an almost westerly direction, influence the weather notably throughout the Caroline and Pelew Islands and Mindanao, and sometimes also in southern Bisayas. An instance of these storms was that of the 18th to the 26th of January of 1895, which swept with great force over Yap on the 20th and over the northeast of Mindanao on the 24th. Other atmospheric disturbances originate north of the tenth parallel, and after crossing the Marianne Islands, recurve in the Pacific Ocean at a far greater distance from the Philippines than from the Marianes. These disturbances are not frequent, and generally, as we have said already, the month of January is comparatively free from atmospheric perturbations. From 1880 to 1898 only six typhoons have been recorded during this month.

A noteworthy exception occurred in January of 1875, when a very severe typhoon traversed the Bisayas; the storm wave that accompanied this hurricane, together with the overflowing of rivers, caused great havoc in property and the loss of many lives. The track of the typhoon on this occasion deviated from the general storm path of cyclonic centers running south of Manila in the month of January, for instead of moving due west it recurved inside of the Archipelago and not far from its western seaboard.

*Temperature.*—As a rule, the temperature of January is the mildest of the whole year round; the monthly average is  $25^{\circ}$  C. ( $77^{\circ}$  F.). The highest temperature record from 1883 to 1898 was  $33.9^{\circ}$  C. ( $93^{\circ}$  F.), registered in January of 1897, and the lowest was  $16.7^{\circ}$  C. ( $62.1^{\circ}$  F.), observed in January of 1886.

*Winds.*—Winds prevail in this month from between north and northeast; they are generally of light or moderate force in Manila; nevertheless, they may blow with some force if pressure runs very high, or any center of depression crosses to the south of Manila. These winds from the first quadrant acquire at times considerable strength along the northern and eastern coasts of the Islands.

*Clouds.*—The mean direction of cloud drifts in January is as follows: The lower clouds (Cu., N., S.) come from N.  $77^{\circ}$  E.; the intermediate clouds (Ci.-Cu., A.-Cu.) from N.  $80^{\circ}$  E., and the higher ones (Ci., Ci.-S.) from S.  $6^{\circ}$  E.

*Rainfall.*—Rainfall is scarce during the month of January in Manila, and is even more so in different parts of the western regions. The average rainfall in Manila from 1865 to 1898 is 30.3 mm. (1.193 inches). The most rainy month of January in this period was that of 1883, when 195.2 mm. (7.685 inches) of water fell. On the other hand, in January of 1884 and 1896 the total amount of rain did not exceed 0.5 mm. (0.020 inch) and 1 mm. (0.039 inch), respectively.

#### FEBRUARY.

*Atmospheric pressure and perturbations corresponding to the month of February.*—The mean barometric pressure of the month of February, deduced from observations of 1883 to 1898, is 761.52 mm. (29.98 inches), and is the highest of the whole year. This month is remarkable in the Philippines for the scarcity of its atmospheric disturbances. In fact, no cyclonic storm whatever has occurred from 1880 to 1898, the changes in the weather being due entirely to areas of low barometric pressure widely diffused and of small importance.

*Temperature.*—The mean monthly temperature of February rises a little over that of the last month of January. The normal thermometric reading for February, deduced from observations made from 1883 to 1898, is  $25.4^{\circ}$  C. ( $77.7^{\circ}$  F.), and differs from the normal of January in  $+0.4^{\circ}$  C. ( $0.7^{\circ}$  C.).

*Winds.*—The winds that in January prevailed from north, north-northeast, and northeast, in the month of February blow generally from the second quadrant, those from the east and east-southeast prevailing; they are rather gusty in the warmer hours of the day, especially in the evening after 2 p. m.

*Clouds.*—The mean direction of inferior clouds (N., Cu., S.) is N. 80° E.; that of the intermediate clouds (Ci.-Cu., A.-Cu.) N. 78° E.; and that of the highest ones (Ci., Ci.-S.) S. 11° E.

*Rainfall.*—Of all the months of the year, February is that of the least rainfall, owing chiefly to the lack of atmospheric depressions. The average rainfall for this month is 10.5 mm. (0.413 inch), deduced from the period 1865–1898. During six years of the period just mentioned the month of February has been noticeable for its total absence of rain.

#### MARCH.

*Atmospheric pressure and perturbations corresponding to the month of March.*—The normal atmospheric pressure of March, deduced from observations made from 1883 to 1898, is 760.60 mm. (29.95 inches) and is 0.92 mm. (0.036 inch) under the normal of February. With the sole exception of February, March is the month of the least atmospheric disturbances, only three typhoons of little importance having been felt in Manila during this month since the year 1880. Two of these storms developed entirely in the Pacific Ocean; the other, however, moved along a path so anomalous for this month that we think a few words about it will be of interest. This center of depression crossed over the north of Mindanao and the south of the Visayas between the 8th and 10th of March of 1898, moving in a west by north direction; the disturbance then gradually changed its direction in the China Sea, and verified a slow but complete recurvature in the space of six days, traveling off the western coast of Mindoro and southern Luzon. On the 16th the cyclonic center was in the interior of Luzon moving toward the northeast, after crossing north of Manila, the winds veering in the latter place from east-southeast to southeast, south-southeast, south, and south-southwest, with frequent rain.

*Temperature.*—The normal temperature of March, deduced from observations corresponding to 1883–1898, is 26.9° C. (80.4° F.), and is 1.5° C. (2.7° F.) over the normal of February.

The highest temperature observed in this month during the aforesaid period was that of March of 1893, viz, 35.5° C. (96° F.), and the lowest, 17.4° C. (63.3° F.), was registered in March of 1885.

*Winds.*—During the present month the winds from eastwards, especially those from east, east-southeast, and southeast, are even more frequent than in February; they often blow in strong gusts in the warmer hours of the afternoon.

*Clouds.*—March is one of the brightest months of the year in Manila. The mean direction of lower clouds (Cu., S., N.) in this month is N. 87° E.; that of the intermediate clouds (Ci.-Cu., A.-Cu.), N. 83° E., and that of the higher clouds (Ci., Ci.-S.), S. 17° E.

*Rainfall.*—Next to February, the month of March is that of the least rainfall in Manila, and generally all along the western coasts of the Archipelago; the mean rainfall of this month, deduced from the period 1865–1898, is only 18.7 mm. (0.736 inch). During the same period no rain at all was observed in the following four years, viz, 1865, 1868, 1869, and 1886.

*Electrical phenomena.*—The first electrical displays generally appear in March, although they are very feeble.

#### APRIL.

*Atmospheric pressure and perturbations corresponding to the month of April.*—The average normal pressure for April, deduced from the period of years comprising 1883–1898, is 759.57 mm. (29.90 inches). Important atmospheric perturbations are very rare in this month. If any occur, they move in low latitudes between the eighth and eleventh parallels and in a west-northwest direction,

penetrating the Asiatic continent to the north of Annam; otherwise they recurve in the Pacific Ocean before reaching Luzon, at a regular distance from the island, and continue afterwards in a northeast direction.

*Temperature.*—The average normal temperature for April, deduced also from the period 1883–1898, is  $28.3^{\circ}$  C. ( $82.9^{\circ}$  F.). The highest temperature recorded during these sixteen years is  $37.2^{\circ}$  C. ( $99^{\circ}$  F.) and corresponds to the year 1889.

*Winds.*—The prevailing winds during this month come from east-southeast and southeast, supposing the state of the weather normal or not disturbed by atmospheric depressions; they blow more persistently and with frequent gusts in the warmer hours, especially from noon till 4<sup>h</sup> or 5<sup>h</sup> in the evening.

*Clouds.*—The mean direction of the lower clouds (Cu., N., S.) during April is from the N.  $89^{\circ}$  E.; that of the intermediate clouds (Ci.-Cu., A.-Cu.), N.  $86^{\circ}$  E.; and that of the highest (Ci., Ci.-S.), S.  $83^{\circ}$  W. Generally speaking, the month of April is the brightest month of the whole year, and the most free from humidity.

*Rainfall.*—The average amount of rainfall for April, deduced from the record of the long period of years comprising from 1865 to 1898, is 29 mm. (1.142 inches). Excepting the months of February and March, the month of April is that of the least rainfall in Manila. No rain at all was registered in the month of April in the years 1865, 1868, 1871, 1877, and 1884. In the rest of the years of the aforesaid period rain was more plentiful during April of 1873, 1879, and 1880. The amount of water measured in the rain gauges of the Observatory in April of each of these three years was 100.9 mm. (3.972 inches), 119.8 mm. (4.717 inches), and 136.4 mm. (5.370 inches).

*Electrical phenomena.*—During April, and especially in the latter portion of the month, thunderstorms may be expected with more frequency than in the preceding month; these electrical discharges in the atmosphere are generally observed between noon and nightfall, but they seldom are of great intensity in this month.

#### MAY.

*Atmospheric pressure and perturbations corresponding to the month of May.*—The normal pressure for May, deduced from this month from observations made during the period 1883–1898, is 758.47 mm. (29.86 inches). Important perturbations in the atmosphere are not so rare in this month, as they are in April generally. Indeed, in some years severe storms have passed over the Islands in this month; such was the great typhoon of the 13th of May, 1895, in which the Spanish steamer *Gravina* was totally wrecked off the western coast of Luzon; such also was the great typhoon of the 10th to the 17th of May, 1896, the vortex of which passed right over the important town of Iloilo, and, recurving in the China Sea, proceeded northeastward, crossing the northwest end of the Island of Luzon. The mean track of the typhoons of this month is very similar to that of April only that they come somewhat nearer to Luzon; thus, for instance, the vortex of the mean parabolic track of typhoons that recurve in the Pacific Ocean is not far from the meridian  $126^{\circ}$  east of Greenwich; on the other hand, the mean track of the typhoons that cross the Islands from east to west runs in a west-northwest direction, midway between the Islands of Samar and Leyte, over the northern part of Panay and south of Mindoro, and is comprised throughout between the parallels  $10^{\circ}$  and  $12^{\circ}$  north latitude. It is well to have in mind, however, a phenomenon that, though rare, seems peculiar and characteristic of the typhoons of May; in some years typhoons that had crossed the Visayan Islands, following the mean typhoon track of this month, on reaching the China Sea have slowly changed their course, and recurving crossed again the Archipelago in the second branch of their parabolic path. This was the case in the *Gravina*

typhoon and in the Iloilo typhoon just before mentioned. Naturally, when such storms as these traverse the Islands bad weather for several days is experienced in the whole Archipelago, with winds and rains of more or less force, according to the distance and intensity of the storm.

*Temperature.*—May is generally the hottest month of the whole year, the average temperature, deduced from the period 1883–1898, being  $28.5^{\circ}$  C. ( $83.3^{\circ}$  F.), superior to the monthly means of all other months. Nevertheless this temperature is much milder if any atmospheric perturbation takes place, and much more so, if any of the storms before mentioned recur to the west of the Islands; the mean temperature of May then, can be fairly compared to that of April or even March, as it was the case in 1895 and 1896, when the mean monthly temperature of May was respectively  $28^{\circ}$  C. ( $82.4^{\circ}$  F.), and  $27.6^{\circ}$  C. ( $81.7^{\circ}$  F.). But if no storm of importance takes place during the month, then the temperature rises considerably; thus in May of 1897 the monthly mean was  $29.4^{\circ}$  C. ( $84.9^{\circ}$  F.).

The highest temperature recorded in the month of May during the period 1883–1898 was  $37.8^{\circ}$  C. ( $100^{\circ}$  F.),  $37.7^{\circ}$  C. ( $99.9^{\circ}$  F.), and  $37.2^{\circ}$  C. ( $99^{\circ}$  F.), observed, respectively, in the years 1889, 1891, and 1897. The lowest temperature in the same period was  $21.7^{\circ}$  C. ( $71.1^{\circ}$  F.), observed in 1892.

*Winds.*—Winds are very variable in this month, blowing sometimes from the first and second quadrants, and sometimes from the third. Generally speaking, the winds from the third quadrant, or southwesterly directions, are sea breezes that blow between 9<sup>h</sup> a. m. and 2<sup>h</sup> or 3<sup>h</sup> p. m.; if they persist in the rest of the day, they are probably due to depressions in high latitudes toward the northeast of Luzon; the winds from the first quadrant (north-east) prevail in the early morning and also during the day, whenever a depression crosses in the south; the winds from the second quadrant (south-east), blow in normal weather in the afternoon, though not so strong as in the months of April and March.

*Clouds.*—The mean direction of clouds in this month is S.  $72^{\circ}$  E. for the lower clouds (Cu., N., S.), S.  $79^{\circ}$  E. for the intermediate clouds (Ci.-Cu. and A.-Cu.), and N.  $73^{\circ}$  E. for the higher clouds (Ci. and Ci.-S.); in normal weather, when no typhoons disturb the atmosphere, the mornings of May are generally bright; but the evenings are often darkened more or less with thunderclouds.

*Rainfall.*—The average amount of rainfall for the month of May, deduced from the years 1865 to 1898, is 106.6 mm. (4.197 inches). In the thirty-four years of this period only two years, 1875 and 1889, were noted for no rainfall whatever. The years conspicuous for rainfall in the month of May were 1887 and 1895, the water collected in the gauges of the Observatory amounting then to 256.9 mm. (10.114 inches) and 246.8 mm. (9.717 inches). The frequency of rains during this month is in direct proportion to the number of thunderstorms and atmospheric perturbations.

*Electrical phenomena.*—May is the most remarkable of all the months of the year for its thunderstorms; indeed, there are few days in the month in which no thunderstorm is observed, and sometimes their electric discharges assume a threatening and terrific grandeur. These tempests are more frequent and of greater violence in the outskirts of a typhoon, so that they often appear in a locality two or three days before the storm, disappear when it rages, and are seen again in the rear of the typhoon. Intense thunderstorms are frequently accompanied with heavy rains and squalls of wind; they are generally observed in the afternoon hours and during the night, and rarely in the early hours of the morning.

#### JUNE.

*Atmospheric pressure and perturbations corresponding to the month of June.*—The normal height of the barometer for June, deduced from the period 1883–1898,

is 758.08 mm. (29.85 inches). In this month, and especially in the last fifteen days, atmospheric disturbances are more frequent and numerous, and sometimes more protracted than in previous months. Some of these perturbations are regular typhoons, with a well-defined nucleus, and move with a regular rate of speed along their path; others are diffused areas or troughs of low pressure that for several days hover around the northwest, north-northwest, north, and north-northeast of Luzon, and give rise in Manila to rains and squalls from the southwest, a phenomenon known to the natives under the name of "colla." This same phenomenon, however, may be occasioned (*a*) by typhoons of great violence that recurve to the northeast or north-northeast of Manila in the Pacific Ocean, moving not far off from Luzon with a very small progressive motion; (*b*) by two or more successive typhoons rapidly succeeding each other; when this happens, the weather experienced in Manila is very similar to that which would be experienced if there were one typhoon alone moving with an extraordinary slow motion.

The characteristic storm paths of June can be divided into three classes. To the first belong the typhoons that originate in the Pacific Ocean near the tenth parallel, and, drifting toward west-northwest, cross the islands of the Archipelago between the Visayas and Luzon; in the period 1880–1898, however, two storms crossed the Island of Luzon during this month, in the years 1884 and 1896, traveling in a west-northwest direction and recurving afterwards in the China Sea. To the second class of typhoons belong those that, originating also in the Pacific at some distance from Luzon, recurve to the northeast or north-northeast of Manila between  $123^{\circ}$  and  $126^{\circ}$  east of Greenwich; these have a remarkable influence in the weather all over the island. The third class of typhoons includes those that occasionally are formed in the China Sea toward the northwest or north-northwest of Luzon; the general track of these storms is toward the continent in a northwest or west-northwest direction, though sometimes they travel to north and northeast.

*Temperature.*—The normal temperature for June is  $27.8^{\circ}$  C. ( $82^{\circ}$  F.), inferior to the normal of the preceding month in  $0.7^{\circ}$  C. ( $1.3^{\circ}$  F.), and to that of April in  $0.5^{\circ}$  C. ( $0.9^{\circ}$  F.). The highest and lowest temperature recorded in this month during the period 1883–1898 has been  $36.1^{\circ}$  C. ( $97^{\circ}$  F) and  $21.6^{\circ}$  C. ( $70.9^{\circ}$  F.); both extremes were observed in the year 1895. The highest monthly means for June have been  $28.7^{\circ}$  C. ( $83.7^{\circ}$  F.) and  $29.5^{\circ}$  C. ( $85.1^{\circ}$  F.), observed, respectively, in the years 1889 and 1897.

The temperature of this month is very mild whenever the weather is influenced by cyclonic storms; otherwise it rises higher in proportion to the scarcity of these depressions.

*Winds.*—The normal distribution of winds during the month of June is as follows: In the early morning calms or light land breezes prevail; sea breezes set in from 9<sup>h</sup> or 10<sup>h</sup> a. m. until 4<sup>h</sup> or 5<sup>h</sup> p. m.; and light or moderate winds blow from the second quadrant from 5<sup>h</sup> to 10<sup>h</sup> or 11<sup>h</sup> p. m.

When any typhoon rages winds will blow in Manila from the first and second quadrants, if the center of disturbance passes between Luzon and the Visayas, and their force will vary in proportion to the intensity of the storm and the distance of the center; if the typhoon has originated and developed in the China Sea the winds in Manila will blow from the second quadrant; lastly, if the typhoon recurves in the Pacific, an influx of constant and squally winds from the third quadrant will prevail.

*Clouds.*—The mean direction of lower clouds (Cu., N., S.) for this month is S.  $40^{\circ}$  E.; that of the intermediate clouds (Ci.-Cu., A.-Cu.) S.  $61^{\circ}$  E.; and that of the higher clouds (Ci., Ci.-S.) N.  $75^{\circ}$  E. The skies are generally bright in the month of June, unless the weather is altered by atmospheric disturbances.

*Rainfall.*—The average rainfall for June in Manila, deduced from the period 1865–1898, is 244.4 mm. (9.622 inches), and exceeds the average of May in 137.8 mm. (5.425) inches. During this period of thirty-four years, the greatest downpours recorded in the month of June occurred in the year 1891, when 655.5 mm. (25.807 inches) of water were received in the gauges of the Observatory; the least rainfall in June was observed in 1893, when only 24.8 mm. (0.976 inch) were received. In this month the frequency and amount of rains depend greatly on the frequency and importance of the atmospheric perturbations; thus, for instance, these disturbances were numerous in June of 1891, and hardly any one of importance occurred in June of 1893.

*Electrical phenomena.*—June is also remarkable for its thunderstorms, though they are not so frequent as in the month of May. This, perhaps, is on account of the greater number of depressions that occur in June, for electrical phenomena are very rare in a locality which is actually under the influence of a cyclonic center. Nevertheless June ranks second to May for the frequency and importance of these phenomena generally.

#### JULY.

*Atmospheric pressure and perturbations corresponding to the month of July.*—The normal pressure of the atmosphere during July, deduced from the period 1883–1898, is 757.50 mm. (29.82 inches) which is 0.58 mm. (0.023 inch) below the normal of the preceding month.

In July the cyclonic storms, or “baguios,” as the natives call them, are more frequent, generally speaking, and their influence is felt in Manila with greater intensity than in the month of June. These storms can be classified into three divisions. To the first belong those that are formed in the Pacific Ocean toward the east or east-southeast of the Island of Luzon and move across the same to the north of Manila, and sometimes farther north across the Baschi and Balingtang Channels; in Manila they nearly always cause an advance of strong winds from the third quadrant. Since the year 1879 only a few storms have passed south of Manila during this month, and were formed inside the Islands in the neighborhood of the Visayas. The second class of typhoons comprises those that have been formed likewise in the Pacific, but which, drifting first toward north-west or north-northwest, recurve afterwards in different latitudes; some curve round off the eastern coast of Formosa and the Baschi and Balingtang Channels, others in higher parallels between China and western Japan, and others finally, after penetrating into the continent, toward the west of Shanghai. To the third class of storms belong the typhoons that develop in the China Sea toward the northwest of Manila; they advance in a west-northwest direction and generally invade the mainland near the south of China or the Tonkin Gulf. The influence of this third class of typhoons on the weather of Manila is much less than that exercised by those of first and second class above mentioned.

*Temperature.*—The normal temperature of July, deduced from observations of the period 1883–1898, is 27.1° C. (80.8° F.), and is below the normal of the preceding month of May to the amount of 1.4° C. (2.5° F.), and under that of June in 0.7° C. (1.3° F.). The highest and lowest temperatures observed during the month of July since 1883 have been, respectively, 34.9° C. (94.8° F.) and 21.1° C. (70° F.); the maximum was observed in the year 1894, and the minimum in 1891.

*Winds.*—The prevailing direction of winds in this month is from the third quadrant, owing to the great number of depressions that run in high parallels north of Manila; their average mean direction is S. 34° W. In the absence of any atmospheric disturbances, however, these southwesterly winds only blow in the warmer hours of the day, generally from 9<sup>h</sup> or 10<sup>h</sup> a. m. till 5<sup>h</sup> or 6<sup>h</sup> p. m.;

in the early hours of the morning calms prevail, or light variable winds from easterly quarters, which blow also during the night after 5<sup>h</sup> or 6<sup>h</sup> p. m. Therefore, whenever the winds blow persistently throughout the day from the third quadrant, it may be assumed as almost certain that there is some center of depression in the Pacific Ocean, more or less distant from Luzon, and toward the northeast of Manila.

*Clouds.*—The mean direction of clouds for the month of July is S. 54° W. for the lower ones (Cu., N., S.), S. 55° W. for the intermediate clouds (A.-Cu., Ci.-Cu.), and for the highest (Ci. and Ci.-S.), N. 76° E.

As in the preceding month, so also in the month of July the sky is generally clear, especially in the mornings, if the weather be not disturbed by atmospheric depressions. Thunderclouds frequently appear in the afternoon and evening hours.

*Rainfall.*—The average rainfall for July, drawn from observations made during the period 1865–1898, is 370 mm. (14.567 inches), and exceeds the average of the month of June in 125.6 mm. (4.945 inches). During the aforesaid period of thirty-four years the month of July most noticeable for its rainfall was that of 1880; 809.8 mm. (31.882 inches) of water were then received in the gauges of the Observatory; the month of July remarkable for the least rainfall was that of 1866, when only 134 mm. (5.276 inches) were received. The frequency and amount of rains is as a rule proportionate to the atmospheric depressions.

*Electrical phenomena.*—Thunderstorms are not so frequent, generally speaking, as in May and June; but nevertheless they display sometimes considerable intensity. As has been observed elsewhere, they are very rare in a locality entirely under the influence of a typhoon.

#### AUGUST.

*Atmospheric pressure and perturbations corresponding to the month of August.* The normal height of the barometer for the month of August, deduced from the period 1883–1898, is 757.75 mm. (29.83 inches), and is 0.25 mm. (0.010 inch) higher than the normal of the preceding month.

As a rule, the typhoons in August are not so frequent as in the month of July. With the exception of a very few of these storms that cross the Archipelago south of Manila, and some others that are formed in the China Sea to the west of the Islands, by far the greater part of the typhoons of this month originate and develop in the Pacific Ocean, off the eastern coast line of Luzon; their storm paths generally lie in one of the two following directions: Some commence to move toward west by north, and pass over the northern provinces of Luzon in direction toward the Tonkin Gulf or southern coasts of China; others incline more to northward, and recurve either east of Formosa and the Baschi and Balingtang Channels or inside the Formosa Channel, or between China and Japan, or even sometimes after penetrating into the mainland. The effect of the storms on the weather of Manila is much the same as that produced by the typhoons of July, for the general storm tracks of these two months are not very dissimilar.

*Temperature.*—The average mean temperature of the month of August, deduced from the period often mentioned, 1883–1898, is 27.1° C. (80.8° F.), exactly the same as the normal temperature of the month of July. The highest temperature ever observed in August during the aforesaid period was 34.6° C. (94.3° F.) in the year 1892, and the lowest of all, 20.6° C. (69.1° F.), in 1896.

*Winds.*—The prevailing winds during this month, generally speaking, blow from between south and west, or in other terms from the third quadrant, and are due principally to the influence of typhoons that cross to the north of Manila. It is well to remember, however, what we have already stated elsewhere, that whenever the Islands are not under the influence of some cyclonic center, these southwesterly winds blow only in the hours of the sea breeze; in the rest of the day the winds are variable, prevailing at times from the second quadrant.

*Clouds.*—The mean direction of the lower clouds (Cu., Cu.-N., N.) during the month of August is S. 56° W.; that of the intermediate clouds (A.-Cu., Ci.-Cu.) S. 54° W., and that of the higher ones (Ci., Ci.-S.) N. 84° E. The same observation that has just been made regarding the directions of the winds has to be made also regarding the direction of clouds, namely, the direction of the lower and intermediate clouds as given above only holds well when the Islands are under the influence of some typhoon; in normal weather the direction of these clouds is rather from eastward.

*Rainfall.*—The amount of rainfall for August, as deduced from the long period of years comprised between 1865 and 1898, is 352.2 mm. (13.866 inches), and differs from the normal rainfall of July to the amount of 17.8 mm. (0.701 inches). The month of August most conspicuous for its rainfall during this period was that of 1877, when 1095.6 mm. (43.134 inches) of rain fell in Manila; the least rainfall for August was observed in 1890, when only 130.8 mm. (5.150 inches) of water was received; this was owing to the fact that August of that year was entirely free from atmospheric disturbances.

*Electrical phenomena.*—With regard to these phenomena, suffice it to say what has already been observed speaking of other typhoon months, namely, that the electric displays are more intense and more frequent, in proportion to the scarcity of atmospheric disturbances.

#### SEPTEMBER.

*Atmospheric pressure and perturbations corresponding to the month of September.*—The mean normal barometric pressure of September, obtained by observations made during 1883–1898, is 757.62 mm. (29.83 inches), and is 0.13 mm. (0.005 inch) under the normal of the month of August.

In September, atmospheric perturbations are generally more numerous than in any other month of the year; a sufficient proof of this is the fact that out of 397 typhoons recorded by the Observatory from 1880 to 1898, both years included, 79 occurred in the month of September, resulting in nearly 20 per cent of the whole of the typhoons recorded.

The general track of these September storms can be classified into three divisions. The first of them originates in the China Sea, toward the west of Luzon, and in this case the disturbances, as a rule, influence the weather of Manila with light winds from south and southeast, accompanied with occasional rains and squalls; the second general storm path develops in the Pacific, and, after moving first to northwest and north-northwest, recurves finally off the east or northeast of Formosa, advancing thence northeastward toward the Japanese Empire; the influence of the typhoons following this track is felt in Manila for several days, with gusty winds and squalls of wind and rain from between west and southwest. The third storm track originates likewise in the Pacific Ocean, moves in a marked westerly direction across the Island of Luzon north of Manila, or the Baschi and Balingtang Channels, and tends in its further course toward the Gulf of Tonkin or the southern coasts of China; the storms on this path are the most severely felt in Manila with winds veering from northwest to southwest; their violence, which sometimes reaches hurricane force, increases in proportion to the minimum distance of the vortex at the time it crosses the meridian of Manila.

*Temperature.*—The mean temperature of September, according to observations made from 1883 to 1898, is 26.9° C. (80.4° F.), and is 0.2° C. (0.5° F.) under the mean temperature of the past month of August. The highest temperature observed in September during this same period was 34.3° C. (93.7° F.), observed in 1898; the lowest reading was 21.4° C. (70.5° F.), observed in 1895.

*Winds.*—Owing to the many typhoons that, as we have already suggested, cross



the northeast and north of Manila in the month of September, the winds generally prevail from the third quadrant in this month, or, in other terms, from between west and south; nevertheless they are variable enough if no atmospheric depression occurs; but if any typhoon be formed in the China Sea, then they will blow from the second quadrant, viz, from between southeast and south.

*Clouds.*—The following is the general direction of cloud drifts for September: The lower clouds (Cu., Cu.-N., N.) move S.  $69^{\circ}$  W., the intermediate clouds (Ci.-Cu., A.-Cu.) S.  $66^{\circ}$  W., and the higher ones (Ci., Ci.-S.) N.  $63^{\circ}$  E.

*Rainfall.*—Rains fall abundantly in this month, and more so if typhoons are frequent. The average rainfall from 1865 to 1898 has been 379.1 mm. (14.926 inches), and exceeds that of August for the same years to the amount of 26.9 mm. (1.059 inches). The most rainy month of September during this period was that of 1867, when 1469.7 mm. (57.862 inches) of water were registered. On the other hand, the month of September of 1885 was notable for its scarcity of rainfall, only 50.8 mm. (2 inches) of water having been received in the rain gauges of the Observatory. Typhoons were also scarce in this month, only one cyclonic storm having then occurred.

*Electrical phenomena.*—Electrical phenomena are not so frequent in September as in other months of the year, and this is especially the case if typhoons are numerous during the month.

#### OCTOBER.

*Atmospheric pressure and perturbations corresponding to the month of October.* The normal pressure in October, deduced from the observations of 1883 to 1898, is 758.88 mm. (29.88 inches), and is 1.26 mm. (0.050 inch) over the normal of the preceding month of September.

The typhoons that influence the weather of the Philippines during the month of October generally originate in the Pacific Ocean in the region of the Mariana or Ladrone Islands, or between that archipelago and the Philippines, and their tracks lay in one of the two following directions: Some recurve in the Pacific off the east or northeast of Luzon, while others assume a decided movement to westward, crossing over the Bisayas or the Island of Luzon. The former sometimes recurve far out between the meridians  $134^{\circ}$  and  $144^{\circ}$  east of Greenwich, and in this case, although they are felt in the Marianas, they are hardly noticed in the Philippines; sometimes they recurve nearer, between the meridians  $124^{\circ}$  and  $134^{\circ}$  east of Greenwich, and then influence the weather of Manila with winds and squalls from the third quadrant. The latter class of typhoons above mentioned, viz, those that cross the Islands, are generally of great intensity, and the direction of their paths is often dangerous and threatening to the city. As a proof of this, we may recall the great typhoon of the 20th of October of 1882, the most terrific storm ever felt here, and which completely laid in ruins the city of Manila; moreover, one of the greatest storms known to have raged in the Islands occurred also in October in the year 1897, on the 12th and 13th days of the month; its path crossed over the south of Samar and the north of Leyte, Cebu, Negros, and Panay; it was the cause of many shipwrecks, and in the storm wave that accompanied it 2,000 victims perished on the two islands of Samar and Leyte alone.

*Temperature.*—The mean temperature of October is  $26.9^{\circ}$  C. ( $80.4^{\circ}$  F.), deduced from the period comprising 1883 to 1898. This reading is exactly the same as the normal temperature of the past month of September. The highest temperature recorded in the month of October during the period just mentioned is  $34.9^{\circ}$  C. ( $94.8^{\circ}$  F.), and was observed in the year 1891; the lowest,  $20.4^{\circ}$  C. ( $68.7^{\circ}$  F.), occurred in 1890. Regarding the temperature of this month, the

mean of the maxima and the mean of the minima is, respectively, 33.2° C. (91.8° F.) and 21.7° C. (71.1° F.).

*Winds.*—The mean direction of winds in October is S. 76° E. This is a very different direction from that given for the preceding months, and the change is due principally to the fact that very few typhoons cross to the north of Manila in October, those that cross in southern parallels, on the other hand, being rather frequent.

*Clouds.*—The lower clouds (Cu., N., S.) drift in October from N. 74° E.; the intermediate clouds (Ci.-Cu., A.-Cu.) from N. 78° E., and the higher ones (Ci., Ci.-S.) from S. 47° E.

*Rainfall.*—Rainfall is more or less abundant in October in proportion to the frequency of the typhoons or atmospheric perturbations that influence the weather of the Philippines during the month. On the whole, the rains are not so heavy as those observed from June to September. The average rainfall for October from 1865 to 1898 is 191.4 mm. (7.536 inches), and is 187.7 mm. (7.389 inches) under the average rainfall of the last month of September. The most rainy month of October since 1865 was that of the year 1869, when 589.7 mm. (23.217 inches) of water were received; in October of 1891 only 39.5 mm. (1.555 inches) were registered.

*Electrical phenomena.*—Thunderstorms begin to be less frequent and of less intensity in the month of October; nevertheless, intense electric displays may yet be observed in advance of a severe typhoon.

#### NOVEMBER.

*Atmospheric pressure and perturbations corresponding to the month of November.*—The normal pressure of November, deduced from the period 1883 to 1898, is 759.55 mm. (29.90 inches), and is over the normal of October in 0.67 mm. (0.026 inch).

Generally speaking, it has been observed in this Observatory since 1880 that typhoons are much less frequent in November than in the four preceding months. Nevertheless, as they enter the Islands south of the fifteenth parallel, they are, like those of October, the most dangerous to the Visayas and southern Luzon, and also to the capital of the Archipelago. As a proof thereof we shall only state here that five absolute barometric minima have been recorded in November during the last ten years, amounting altogether to one-half of the entire absolute annual minima; this, in other words, implies that during the last ten years the greater part of the severest typhoons felt in Manila have occurred in November. There have been, however, some exceptions; thus in November of 1896 no disturbance of any importance occurred throughout the Archipelago.

Some typhoons of November cross the Islands in the latitude above mentioned, toward west-northwest or west; others, not so frequent, recurve in the Pacific Ocean east or northeast of Luzon and move thence toward the Japanese Empire. These typhoons are felt in Manila with winds and squalls from the third quadrant, of intensity proportional to the distance of the vortex.

Occasionally in past years a typhoon has crossed over northern Luzon; but this is not frequent, and in any case the storms then have been observed to break up shortly after leaving the island; otherwise they recurve in the China Sea off the northwest of Luzon.

*Temperature.*—Temperature is generally milder in November than in preceding months; the average, deduced from the period 1883-1898, is 26.1° C. (79° F.), and is 0.8° C. (1.4° F.) under the normal of October. The highest temperature of the aforesaid period was 33.4° C. (92.1° F.), registered in November of 1886; the lowest, 18.3° C. (64.9° F.), was observed in 1890.

*Winds.*—Winds begin to blow in November from the first quadrant, and their

mean direction is from N. 28° E. Southwesterly winds are only observed in the hours of sea breeze, and whenever a depression is running north or northeast.

*Clouds.*—The mean direction of the lower clouds (Cu., N., S.) is from N. 83° E.; the intermediate (A.-Cu., Ci.-Cu.) from N. 89° E., and the higher clouds (Ci., Ci.-S.) from S. 69° E.

*Rainfall.*—The average rainfall for November, deduced from observations of 1865–1898, is 130.2 mm. (5.126 inches), and is 61.2 mm. (2.410 inches) under the normal of the past month of October. The heaviest rainfalls during the period first mentioned amounted to 397.8 mm. (15.662 inches) and 306.6 mm. (12.071 inches) in the years 1879 and 1891; both years were noted for the typhoons that crossed near Manila. On the other hand, in November of 1896 the least rainfall of the whole period, 29.8 mm. (1.173 inches), was registered; no typhoon occurred in that month. Thus the rainfall is proportional to the number and the intensity of atmospheric disturbances.

*Electrical phenomena.*—Thunderstorms and electric displays are rare and feeble in November, and continue to diminish from the beginning to the end of the month.

#### DECEMBER.

*Atmospheric pressure and perturbations corresponding to the month of December.*—The mean normal pressure of December for the period 1883–1898 is 760.92 mm. (29.96 inches) and is over the normal of last month in 1.37 mm. (0.054 inch).

In December cyclonic disturbances are very seldom dangerous to Manila. Since the beginning of the Observatory, only two or three typhoons have been observed to pass near the capital, one of which, for instance, was that of the 4th of December of 1889; the barometer on that occasion fell to 750.29 mm. (29.54 inches) and almost reached the lowest barometric reading of the whole year.

With these few exceptions, it may be said that typhoons are generally very rare in the month of December, and, if any occur, their tracks run far off from Luzon, sometimes recurving in the Pacific Ocean, and sometimes crossing over the Island of Mindanao, the Visayas, and Palawan, traveling toward the China Sea.

*Temperature.*—Temperature is very mild in December. The mean monthly temperature, according to observations made from 1883 to 1898, is 25.2° C. (77.4° F.), and is 0.9° C. (1.6° F.) under the normal of the past month of November, and close to the mean temperature of January, which also coincides with the mean temperature of the whole year. The highest temperature recorded since 1883 was 33.3° C. (91.9° F.), in 1888, and the lowest 15.7° C. (60.3° F.), in 1892.

*Winds.*—Winds prevail from north and northeast in this month, and frequently bring heavy rains to the eastern coasts of the Islands. When accompanied with high barometric pressure they are felt in Manila with some force and occasional rain.

*Clouds.*—The lower clouds (Cu., N., S.) come from N. 82° E., the intermediate ones (A.-Cu., Ci.-Cu.) from N. 85° E., and the higher ones (Ci., Ci.-S.) from S. 55° E.

*Rainfall.*—Although heavy rains are frequent during the month along the Pacific coasts of the Archipelago, in Manila and all along the western coast of Luzon they are generally scarce. The average rainfall in Manila from 1865 to 1898 is 54.2 mm. (2.134 inches). December of 1896 was exceptional for the small amount of water that fell, only 0.2 mm. (0.008 inch) having been registered in the gauges of the Observatory. On the other hand, the month of December of the most rainfall during the aforesaid period was that of 1889, when, owing to the typhoon above mentioned, 346.9 mm. (13.658 inches) of water were received in the rain gauges.

## Atmospheric pressure, 1883-1898.

Month.	Mean normal.		Highest barometric mean.			Lowest barometric mean.			Absolute maximum.			Absolute minimum.		
	Mm.	Ins.	Mm.	Yrs.	Ins.	Mm.	Yrs.	Ins.	Mm.	Yrs.	Ins.	Mm.	Yrs.	Ins.
January	761.27	29.27	763.60	1885	30.06	759.68	1890	26.91	767.29	1885	30.21	754.56	1883	29.71
February	61.52	29.98	62.91	1884	30.04	59.26	1898	29.89	66.78	1891	30.19	53.82	1898	29.68
March	60.60	29.95	62.39	1885	30.02	58.30	1898	29.85	65.87	1886	30.15	53.00	1898	29.65
April	59.57	29.90	60.75	1884	29.95	58.88	1898	29.88	63.56	1884	30.06	53.60	1887	29.67
May	58.47	29.86	59.89	1885	29.92	57.47	1893	29.82	62.86	1885	30.03	46.12	1893	29.38
June	58.08	29.85	58.96	1893	29.88	57.04	1898	29.81	62.56	1886	30.02	51.65	1896	29.59
July	57.50	29.82	58.61	1886	29.87	56.00	1888	29.76	61.98	1883	30.00	47.50	1888	29.43
August	57.75	29.83	58.61	1892	29.87	56.85	1895	29.80	62.62	1888	30.02	50.07	1884	29.53
September	57.62	29.88	59.57	1885	29.90	56.24	1890	29.77	62.84	1885	30.03	42.34	1894	29.23
October	58.88	29.88	60.28	1885	29.93	57.52	1898	29.82	63.43	1888	30.06	48.02	1894	29.45
November	59.55	29.90	61.39	1885	29.98	57.26	1898	29.81	66.12	1885	30.16	43.50	1890	29.27
December	60.92	29.96	62.52	1883	30.02	58.90	1889	29.88	66.04	1883	30.16	50.29	1889	29.54
Annual	59.31	29.89	63.60	1885	30.06	56.00	1888	29.76	67.29	1885	30.21	42.34	1894	29.23

## Temperature, 1883-1898.

Month.	Mean normal.		Highest thermometric mean.			Lowest thermometric mean.			Absolute maximum.			Absolute minimum.		
	°C.	°F.	°C.	Yrs.	°F.	°C.	Yrs.	°F.	°C.	Yrs.	°F.	°C.	Yrs.	°F.
January	25.0	77.0	25.8	1889	78.4	23.6	1884	74.5	33.9	1897	93.0	16.7	1886	62.1
February	25.4	77.7	26.4	1889	79.5	24.4	1885	75.9	35.4	1892	95.7	16.1	1888	61.0
March	26.9	80.4	27.7	{1883 1897}	81.9	26.1	1885	79.0	35.5	1893	95.9	17.4	1885	63.3
April	28.3	82.9	29.4	1889	84.9	27.3	1885	81.1	37.2	1889	99.0	18.9	1894	66.0
May	28.5	83.3	30.3	1889	86.5	27.6	1896	81.7	37.8	1889	100.0	21.7	1892	71.1
June	27.8	82.0	29.5	1897	85.1	27.0	1884	80.6	36.1	1895	97.0	21.6	1895	70.9
July	27.1	80.8	27.5	{1889 1895 1897}	81.5	26.1	1888	79.0	34.9	1894	94.8	21.1	1891	70.0
August	27.1	80.8	27.7	1893	81.9	26.4	1896	79.5	34.6	1892	94.3	20.6	1896	69.1
September	26.9	80.4	27.6	{1885 1888}	81.7	26.3	1887	79.3	34.3	1898	93.7	21.4	1895	70.5
October	26.9	80.4	27.5	1895	81.5	26.1	1890	79.0	34.9	1891	94.8	20.4	1890	68.7
November	26.1	79.0	26.8	1897	80.2	25.4	1890	77.7	33.4	1886	92.1	18.3	1890	64.9
December	25.2	77.4	26.0	1888	78.8	24.1	1883	75.4	33.3	1888	91.9	15.7	1892	60.3
Annual	26.8	80.2	30.3	1889	86.5	23.6	1884	74.5	37.8	1889	100.0	15.7	1892	60.3

## Relative humidity and aqueous vapor tension, 1883-1898.

Month.	Relative humidity.			Vapor tension.					
	Mean normal.	Extremes.		Mean normal.		Extremes.			
		Maximum.	Minimum.			Maximum.		Minimum.	
	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Mm.</i>	<i>Inch.</i>	<i>Mm.</i>	<i>Inch.</i>	<i>Mm.</i>	<i>Inch.</i>
January	77.7	100	40.0	18.1	0.713	26.0	1.024	11.9	0.469
February	74.1	100	33.0	17.7	.697	25.2	0.992	9.7	.382
March	71.7	100	31.5	18.7	.736	29.0	1.142	9.9	.390
April	70.9	100	33.0	19.9	.784	28.9	1.138	12.0	.472
May	76.9	100	32.0	22.0	.866	28.5	1.122	12.9	.508
June	81.5	100	36.0	22.5	.866	27.6	1.087	14.9	.587
July	84.9	100	52.5	22.4	.882	27.3	1.075	17.2	.677
August	84.4	100	52.0	22.4	.882	27.5	1.083	17.5	.689
September	85.6	100	51.0	22.5	.886	27.2	1.071	15.6	.614
October	82.6	100	46.0	21.6	.850	26.7	1.051	14.2	.559
November	81.6	100	39.0	20.3	.799	25.8	1.016	11.2	.441
December	80.7	100	39.5	19.1	.752	26.8	1.053	11.5	.453
Annual	79.4	100	31.5	20.6	.811	29.0	1.142	9.7	.382

*Rainfall, 1865-1898.*

Month.	Mean normal.		Monthly maximum.		Monthly minimum.		Greatest daily.	
	<i>Mm.</i>	<i>Inches.</i>	<i>Mm.</i>	<i>Inches.</i>	<i>Mm.</i>	<i>Inches.</i>	<i>Mm.</i>	<i>Inches.</i>
January .....	30.3	1.193	195.2	7.685	0.5	0.020	186.1	7.327
February .....	10.5	.413	39.6	1.559	.0	.000	38.0	1.496
March .....	18.7	.736	100.2	3.945	.0	.000	60.0	2.362
April .....	29.0	1.142	136.4	5.370	.0	.000	43.8	1.724
May .....	106.6	4.197	256.9	10.114	.0	.000	166.8	6.567
June .....	244.4	9.622	655.5	25.807	24.8	.976	252.7	9.949
July .....	370.0	14.567	809.8	31.882	134.0	5.276	290.1	11.421
August .....	352.2	13.866	1,095.6	43.134	130.8	5.150	226.5	8.917
September .....	379.1	14.925	1,469.7	57.862	50.8	2.000	336.0	13.228
October .....	191.4	7.536	589.7	23.217	39.5	1.555	172.0	6.772
November .....	130.2	5.126	397.8	15.662	29.8	1.173	180.6	7.110
December .....	54.2	2.134	346.9	13.658	0.2	.008	00.0	3.543
Annual .....	1,916.6	75.457	1,469.7	57.862	-----	-----	336.0	13.228

From the middle of November until the middle of March the temperature of Manila is delightful, and from that time until the latter part of June it is hot during the middle of the day, but considerably less so than in many of the Southern States in the summer, and cool compared to the Texas border, along the Rio Grande, at the same season. From July to November, during the rainy season, the temperature is very little higher than during the winter months, which is due to the frequent rains and clouded condition of the sky. Many persons who have spent years in the Philippines prefer the rainy season to any portion of the year. During the first years of American occupation, when skirmishes and severe "hikes" were daily occurrences, our troops suffered severely from intestinal and malarial affections, which were caused not only by the inevitable hardships and unavoidable exposure to the elements, incident to all campaigns, but also, in part, by lack of care in avoiding impure water and by needless exposure in many instances to the rays of a tropical sun. Partly as a result of the large amount of sickness which occurred among our troops and partly from grossly misleading and exaggerated accounts sent to newspapers and friends in the United States, the climate of the Philippines has been misrepresented and many Americans have been dissuaded from going to the Islands.

As a rule, all newcomers to the Tropics, especially those accustomed to a vigorous and bracing climate, lose flesh, vitality, and energy during acclimatization. This is even true with people living in the northern part of the United States who settle in Texas and other parts of the South. The acclimatization of immigrants in the Tropics usually requires from two to three years, and at the end of that period, provided the climate agrees with one, both flesh and health return. The fact should not be overlooked that certain people can no more become adapted to a tropical climate than others can to a rigorous one. While no arbitrary rule can be fixed as to the time one should remain in the Tropics after the first visit, the period should be limited to three or four years, even though nothing has occurred to disturb the general health during that period.

English business houses in the Orient, and especially those in the Tropics, give their employees a year's leave of absence on full pay after five years' service, and those who decide to make their home in the Philippines should make provision for some change after a fair degree of service, though this will not necessarily mean a return to the United States nor even a journey to Japan, as has been the custom with many hitherto.

The table-lands surrounding Lake Lanao in the Island of Mindanao lie at an altitude of about 2,500 feet above the sea and are spoken of very highly as a delightfully cool and healthful climate.

The Americans have had but little experience, however, with this portion of the Archipelago, as until quite recently it was a *terra incognita*. The physical features of the Philippines are mountains, plains, valleys, rivers, and lakes, and owing to the character of vegetation and foliage the Islands present a delightful picture of eternal spring. The mountain districts of Luzón, Mindanao, Sámar, and others of the larger islands are extensive, and in many cases are occupied by distinct races, who never leave their mountain abodes. The territory occupied by these people has frequently an altitude of from 4,000 to 5,000 feet above the sea. As altitude overcomes latitude, it is more than probable that in the future health resorts will be established in the Philippine mountain regions, where a cool and invigorating climate can be enjoyed and tropical enervation be more or less avoided without leaving the borders of the Archipelago.

Indeed, the problem of maintaining a good standard of health among the American families and employees compelled to live for long, continuous periods of time in the Islands seems very near solution in the establishment of a health resort in the high table-lands and forest-covered mountain regions of Luzón to the north of Manila. The Civil Government has just completed a sanitarium at Baguio, Province of Benguet, capable of housing sixty patients, and summer cottages are now building for separate families.

This region has a cool, bracing atmosphere, an abundant supply of good water, is sufficiently extensive for the pasturing of cattle, and the growing of fruits, vegetables, and grain. Baguio is located about 4,770 feet above sea level, in the midst of a pine forest extending for miles in all directions.

The only trees at all common in the immediate region are the tree fern and the pine, strange and beautiful companions. On the mountains at a height of 5,500 to 6,000 feet the oak grows, a fact that has to be substantiated by a personal visit or a handful of acorns as proof, but it is nevertheless the truth. At Baguio a grate fire is almost a necessity during the rainy and cool season, especially in the evening, and blankets are necessary at night during the entire year. It is not

expected that all tropical diseases will yield to the invigorating effects of this climate, but to the American and European residents of the Tropics enervated by hard work in the lowland, it will supply the ozone and the brace so indispensable to the white race.

A Government wagon road is now being constructed from Dagupan, the terminus of the Manila and Dagupan Railway, to Baguio. It is expected that this road will be completed in 1904, thus rendering Baguio easily accessible. The road throughout most of its length follows the cañon of the Bued River, passing through magnificent and picturesque mountain scenery.

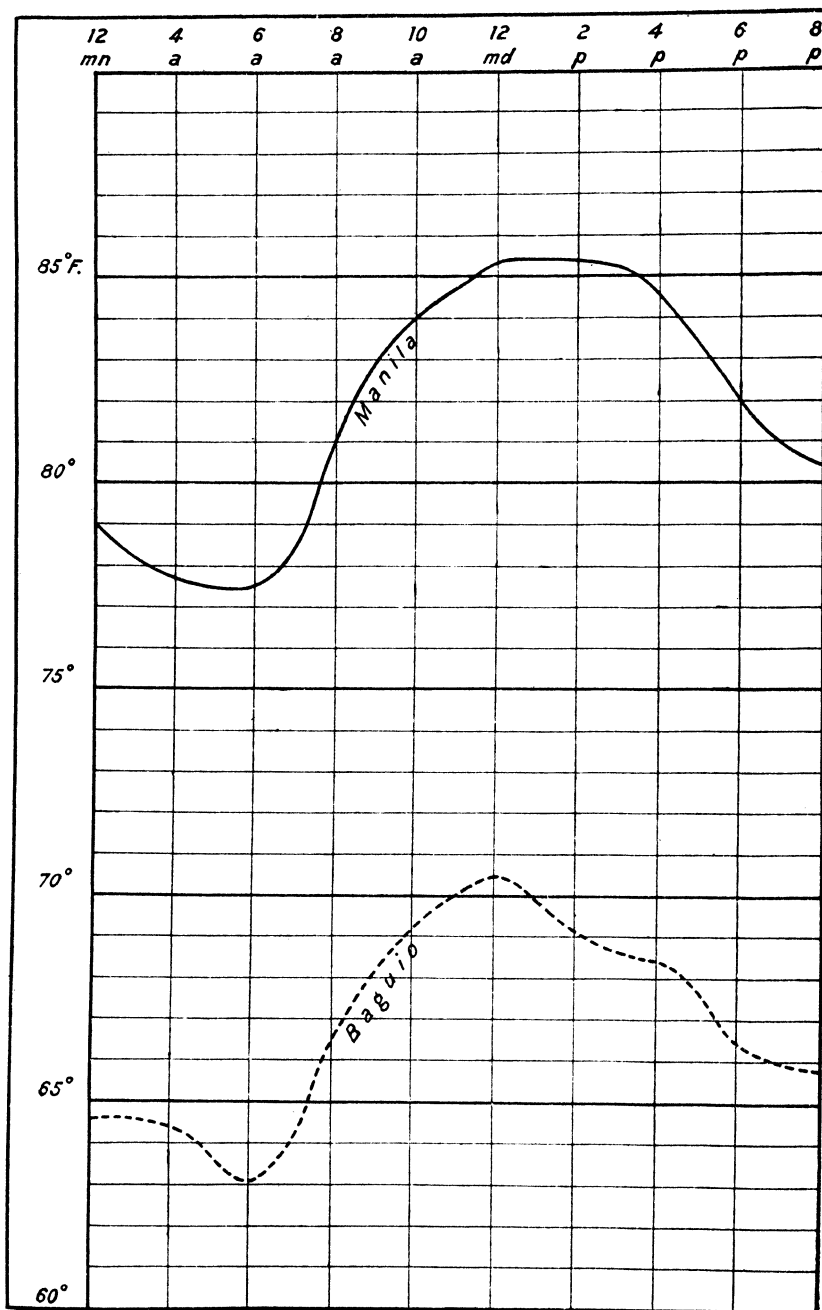
The remarkable character of the climate of Benguet will be better appreciated if a brief comparison is made between it and the climate of Manila.

*Comparison between the temperature, relative humidity of the atmosphere, and rainfall at Baguio and Manila during the months of August, September, and October, 1900.*

	August.			September.			October.		
	Ma-nila.	Ba-guio.	Dif-fer-ence.	Ma-nila.	Ba-guio.	Dif-fer-ence.	Ma-nila.	Ba-guio.	Dif-fer-ence.
Temperature:	°	°	°	°	°	°	°	°	°
Maximum	95.3	76.8	18.5	91.1	76.6	14.5	91.8	75.9	15.9
Minimum	72.4	59.0	13.4	72.7	61.2	11.5	71.3	56.8	14.5
Mean	81.4	65.9	15.5	81.5	66.9	14.6	81.0	67.4	13.6
Mean daily maximum	87.0	69.3	17.7	87.0	71.5	15.5	88.0	72.4	15.6
Mean daily minimum	75.8	63.5	12.3	75.6	63.2	12.4	73.0	62.1	10.9
Greatest daily variation	17.2	12.6	4.6	15.6	13.7	1.9	20.1	16.2	3.9
Least daily variation	4.9	0.9	4.0	3.9	0.9	3.0	4.7	6.2	1.5
Mean daily variation	11.3	5.46	5.84	11.5	7.88	3.62	15.3	10.28	5.02
Humidity:									
Maximum	95.0	97.4	2.4	93.3	95.6	2.3	96.4	92.0	4.4
Minimum	81.0	83.6	2.6	78.3	81.8	3.5	72.6	70.2	2.4
Mean	86.9	91.6	4.7	86.3	89.4	3.1	83.2	83.1	0.1
Rainfall	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
	28.5	37.04	8.54	11.32	12.16	0.84	6.9	4.96	19.4

These facts speak for themselves. It is hard to conceive of a region affording a more delightful temperature than Baguio, where it is always cool and never cold. The highest temperature recorded during August, September, and October is 76.8°. The observations of a Spanish commission which examined the same region, began on the 24th of May and lasted until the 22d of July, the maximum temperature recorded during that period being 75.2°. These data cover the hottest part of the year, and the absolute maximum temperature is probably very close to 77°. From the best available data it would seem that the absolute minimum was about 45°. The lowest temperature occurs during that period of the year when the skies are clear and the air is dry.<sup>1</sup>

<sup>1</sup> A more recent report on the climate of Baguio may be seen in the first part of the Report of the Director of the Philippine Weather Bureau, "The Climate of Baguio," by Rev. José Algué, S. J., Director of Philippine Weather Bureau, Manila, 1902.



MEAN DAILY TEMPERATURE AT MANILA AND BANGUIO, BASED ON THE OBSERVATIONS MADE DURING AUGUST, SEPTEMBER, AND OCTOBER, 1900.





A striking feature of the temperature at Baguio is its uniformity, the greatest daily variation recorded for three months was  $13.7^{\circ}$  and the least daily variation nine-tenths of a degree. At Manila the greatest daily variation during the same period was  $20.1^{\circ}$ , and the least was  $3.9^{\circ}$ . The mean daily variation for three months at Manila was  $12.6^{\circ}$  and at Baguio was  $7.87^{\circ}$ , or  $4.73^{\circ}$  less than at Manila. The bracing character of the atmosphere is attested by everyone who has visited the Province of Benguet, and its purity is shown by the fact that fresh meat keeps without ice for from three to six days, according to the season.

The records show that the relative humidity during the months of August and September was slightly greater at Baguio than at Manila, but during the month of October was slightly less.

In this connection it may be worth while to insert a brief table, borrowed from the report of the Spanish commission, in which a comparison is made between the temperature, relative humidity, and rainfall for the year at Baguio and at Manila.

Yearly.	Manila.	Baguio.
Maximum temperature..... $^{\circ}\text{F}$	96.8	75.2
Minimum.....do	60.8	46.4
Mean temperature.....do	77.0	62.6
Mean barometric pressure.....inches	29.7	25.2
Relative humidity—mean degree.....	64	60
Days of rain—mean number.....	160	160
Quantity of rainfall.....	70 to 118	59 to 78

While some writers call the climate of the Philippines “lovely,” others call it “deadly,” and the Spaniards were accustomed to describe the weather as consisting of four months of dust, four months of mud, and four months of everything, yet from such contradictory testimony a few facts may be drawn. For a tropical country the climate and health conditions are good, as evidenced by the low mortality among the employees of the Civil Government who have now been there long enough to give the climate a thorough test, and it is safe to say that with improved sanitation, a better knowledge of the laws of health to be observed in that climate, and with the increased comforts and conveniences that follow the wake of American control, the climate offers no serious objection to those who desire to make the Philippines the theater of their efforts to carve a fortune for themselves while aiding in the development of the rich resources of that virgin land.

The Philippines are unusually healthy compared with other tropical lands, but while this is true, two classes of diseases have to be reckoned with. They are, first, those common to temperate and tropical countries, and, second, those especially characteristic of the latter region. Under the former head would fall smallpox, cholera, bubonic plague, and leprosy.

Smallpox is endemic in the Islands. The natives have but little fear

of it and are apt to neglect the necessary precautions to prevent its spread, unless compelled to adopt them. Experience has shown that it can be stamped out by thorough vaccination. A particularly efficient virus is obtained from the carabao in the laboratory established at Manila for this purpose by the Government, and other laboratories are to be established at convenient points. Upon the occupation of Manila smallpox was very common in a most malignant form both in the city and throughout the provinces. As a result of careful vaccination performed by the Board of Health and medical officers of the Army in the provinces during the past four years the disease has almost entirely disappeared. As in the case of Porto Rico, it is but a question of time until the disease will be practically banished from the Archipelago.

A much more serious matter is the cholera. There have frequently been more or less destructive epidemics of this disease in the past, the last being in 1902, and as China, the breeding ground of this disease, is not distant, and communication frequent, the danger of epidemics imported from that country can be avoided only by the maintenance of a strict quarantine service.

Bubonic plague appeared in Manila in December, 1899, but never made any considerable headway. The largest number of cases in any one week was 17, and the largest number of deaths was 14. The disease was not entirely eradicated until May, 1902, when the city of Manila was declared free from the plague. During this time there were 483 cases with 406 deaths among the Chinese, 277 cases and 222 deaths among Filipinos, and but 5 cases among American residents, certainly not a surprising number in a city of 300,000 inhabitants. The success obtained in holding in check this disease bears eloquent testimony to the efficiency of the quarantine service of the Manila Board of Health, and is in striking contrast with what occurred in the neighboring port of Hongkong, and later on the west coast of the Republic of Mexico.

Leprosy is a disease common to all tropical countries, but is also found in temperate regions, and as far north as Norway, Sweden, and Iceland. The number of lepers living in the Philippines at the time of the American occupation has been variously estimated at from 15,000 to 30,000. These figures were given by the friars and others, who were presumed to have understood the situation. From a census taken by the Board of Health during the year 1902 it is now believed that not over 5,000 cases exist in the Islands, and they appear to be uniformly scattered throughout the entire Archipelago.

Tradition ascribes its introduction into the Islands from Japan about two hundred years ago. It is said that one of the Shoguns, learning of the good work performed by the friars in the Philippine Islands, decided to send a shipload of Japanese lepers to the Philippines for their care. This was done about 1662.

The affection is dependent upon a specific germ, the bacillus lepræ,

but is practically no more contagious than consumption. It is very common to find leprous relatives who have lived for years with their families without imparting the disease to other members of the household. One native woman has lived among the lepers of San Lazaro Hospital for twenty years as cook, and has given birth to a leprous son who is now grown, without ever contracting the disease.

No systematic effort has ever been made to stamp out leprosy in the Philippines. There is a leper hospital in Manila, one at Palestina, and another at Cebú, but there has never been any comprehensive plan for segregating those afflicted with this disease. Soon after the arrival of the military authorities of the United States an inspection of the smaller islands of the Archipelago was undertaken with a view of selecting one suited to the needs of a leper colony and the ultimate isolation of all lepers. During the year 1902 a committee appointed to examine and decide upon a site for a leper colony recommended the Island of Culion in the Calamianes Group, which, according to d'Almonte, contains 388 square kilometers, on account of its healthful climate, rich soil, extensive cattle ranges, abundant water supply, good harbors, and the small population that at present inhabit that island.

The desirability of establishing a colony where persons in the early stages of the disease can have their homes, cultivate the soil, and in general lead a free out-of-door life, instead of being practically imprisoned and compelled to pass their days in company with fellow unfortunates in the last stages of this horrible disease, is self-evident. Arrangements have already been made to erect a warehouse on Halsey Bay, a road has been built to the proposed site of the town, some 4 miles from the bay, and a superintendent's house has been erected, together with a hospital, and over 100 separate dwellings for the poor unfortunates, whom it is proposed to remove from Manila, Cebú, and Palestina. In this connection it is but just to state that leprosy is confined to the Chinese and natives of the Islands, and there is no known case among the European or American residents.

There are a number of diseases like diarrhea, dysentery, and malaria, which, though not properly tropic in character, manifest themselves in such a climate in the most severe form. On the other hand, such diseases as scarletina and diphtheria are far less common than in more temperate zones. While many parts of the Archipelago are extremely healthful, they vary widely in this particular, as do different localities on the same island. Mindoro and Balábac, for example, have deservedly a bad reputation, while Sibuyan, Guimarás, Siquijor, and Cebú are considered especially healthful.

The climate and health conditions of the Philippines are as a whole surprisingly good, and it is doubtful whether any other tropical country of the world is more favored in this respect. This is demonstrated by comparing the sick reports of our troops while in camps in the United

States with the reports for the time during which they have been engaged in active service in the Philippines. While it may be predicted with confidence that the carrying out of the plans of the well-organized Department of Public Health will tend to a general improvement in sanitary conditions, it will doubtless remain true that troops that are obliged to campaign in the damp lowlands or garrison towns which have sprung up in situations where towns should never have been built, will suffer more or less. The change made in the sanitary conditions of Santiago de Cuba, Havana, and other Cuban towns, as well as the revolution effected in Porto Rico, and the surprising and almost incredible decrease in the mortality statistics, show what may be done in hot countries toward improving the health conditions of places that in the past have been considered the plague spots of the earth.

Modern science and invention have robbed the Tropics of most of their discomforts and many of their dangers, so that people from the temperate zones are now living there with comfort and health, as can be seen in India, where Englishmen are engaged in all sorts of enterprises.

In the treatment of diseases peculiar to tropical lands it is well known that a suitable change of climate is often more effective than any drugs that can be administered. Recuperation from severe wounds or wasting diseases is slow in low altitudes and the long experience of the British in India, the Dutch in Java, and our own brief experience in the Philippines have shown that an occasional change to a cooler climate is very desirable, even for those who live in the more healthful parts of the Archipelago. Especially is this true of white children, who usually do very well up to the age of 8 or 10 years and then seem to require a change.

## Chapter V.

### FLORA.

[By Elmer D. Merrill.]

Colonial Botanical Gardens—Recognition of need of work on the flora of the Philippines by the Civil Commission—The richness of the flora—Striking characteristics of the flora—The relationship with surrounding countries—The flora increased by species introduced from Malaya and America—Our present lack of knowledge of the flora—Botanical regions in Luzon, Mindoro, Paragua, and the southern islands—The classification of the typical vegetative areas—Littoral vegetation: Mangrove, tidal, strand—Bamboo jungles—Savannahs—Deserted clearings—The higher mountains—The vegetation in the vicinity of towns: Trees, shrubs, herbaceous plants—The forest regions.

In the colonial possessions of Great Britain and Holland the fact that an accurate knowledge of the flora of the country is the first essential for future successful agricultural and forestry work was realized in the beginning of their colonial administration and, consequently, there are to be found in Java, Hongkong, Singapore, Penang, Ceylon, and India long-established botanic gardens, each with magnificent collections of growing plants, both native and foreign, large herbaria, and complete botanical libraries. In all these institutions the primary object has been to study and classify the flora of the several countries and, secondly, to inquire into the economic, agricultural, and forestry problems. This primary work has now been accomplished, and these institutions, thus thoroughly grounded, are working on economic questions pertaining to agricultural and timber industries.

In the Philippines this same principle finally came to be recognized, but not until after several centuries of occupation. The Spaniards had, however, done much toward developing a botanical knowledge of the plants of the Archipelago, but the invaluable collections and hardly less valuable library were destroyed by fire prior to American occupation, causing a loss that will take years to replace. A botanic garden in the Philippines is a matter of such great importance to the agricultural interests of the Islands that the question has received the serious consideration of those directly interested, and it is thought that before long a site will be selected where scientific work on timber, fiber plants, fruits, medicinal plants, food plants, and those that produce dyes, tans, gums, resins, gutta-percha, etc., can be carried on to the material benefit of every inhabitant of the Islands.

The botany of the Philippines has not received the attention from scientists that has been devoted to the fauna, and whatever attention has been paid to the vegetation has been directed to its economic rather than scientific features.

The importance of a more thorough knowledge of the flora of the Archipelago was recognized by the Philippine Commission, and in February, 1902, the position of botanist was provided for in the Bureau of Agriculture. In July, 1902, the botanical work of the Forestry Bureau was united with that of the Agricultural Bureau and in July, 1903, all botanical work, herbarium, botanical books, and equipment was transferred to the Bureau of Government Laboratories. In this Bureau a thoroughly equipped botanical laboratory is being organized, with a complete botanical library and working herbarium, and in the near future it is hoped that the work can be extended from purely systematic botany to all lines of botanical investigations; and that the laboratory may become the objective point of those American botanists who may wish to pursue investigations on a tropical flora.

Like that of all tropical countries where there is an abundant rainfall, the flora of the Philippines is very rich. Comparatively speaking, little is known regarding the flora of the Archipelago, other than the more common species and those of economic value. So far as the flora has been worked out the most striking characteristics are the very large per cent of endemic species and the very few endemic genera. Of the 4,500 species of plants from the Archipelago at present known over 1,200 species are endemic, while but seven genera are endemic. It is very probable, however, that this number of endemic genera will be increased as our knowledge of the flora is perfected. It is probable that there are at least 8,000 species of phanerogams and vascular cryptogams in the Philippines at the present time, and one prominent worker on the flora of this region is of the opinion that eventually at least 10,000 species will be found here. At present, as noted above, only about 4,500 species have been reported from the Archipelago, probably about one-half of the number of species indigenous to the Islands. Thorough botanical collections have been made only in certain localities in the Island of Luzon, and our knowledge of the flora of the southern islands is exceedingly limited, while from many islands, and from most of the high mountains in the group, no botanical material has ever been collected.

The 4,500 species at present reported from the Archipelago represent 151 families and about 1,100 genera.

The relationships of the Philippine flora with that of surrounding countries is a matter of great interest, and has been ably discussed by Mr. R. A. Rolfe, who points out the connecting links of our flora with that of Java, Sumatra, Borneo, the Moluccas, Celebes, Australia, Polynesia, Formosa, Southern China, and the Malayan Peninsula.

The flora of the Archipelago has been increased by the introduction of many species of economic or ornamental value from other tropical countries, many of which have become spontaneous and thoroughly naturalized. Before the Spanish occupation, during the successive Malayan invasions, many of the fruit-bearing trees and other plants of economic value were introduced from the Malayan Archipelago and British India, while after the Spanish occupation many American species were purposely or accidentally introduced. At the present time about 60 species of American origin are found in the Archipelago, most of them having become spontaneous. The following plants of economic value are all of American origin: Tobacco, corn, potatoes, sweet potatoes, cacao, chico, maguey, guava, tomatoes, cassava, pineapple, peanuts, papaya, ciruelas, cashew nut, custard apple, chico-mamey, and other species.

At the present time our knowledge of the flora of the Archipelago is too limited to admit making any attempt to divide the Archipelago into botanical regions, although some work has been done on this subject by Rolfe, Vidal, and Christ.

The Island of Luzón, the botany of which is better known than that of any other island in the Archipelago, seems to present five fairly distinct botanical regions—the northern part of Luzón, the region between the Cagayan Valley and the Pacific coast, the Zambales region, extending from the Caraballo Sur Mountains to Laguna de Bay, and Southern Luzón, extending from the Province of Laguna to Albay. These five regions have many characteristics in common, and further study of the flora of the several regions may necessitate radical changes in this classification. All of these regions contain high, densely forested mountains, humid river valleys, and extensive areas of open grass lands.

Mindoro presents at least two distinct regions, the northern part of the island, with a very heavy rainfall, no doubt caused by the presence of very high mountains, and characterized by a most luxuriant vegetation; while southern Mindoro has apparently much less rainfall, and is characterized by “thin” deciduous forests, and large areas of open grass land.

Paragua, which connects the flora of the northern Philippines with that of Borneo, should prove an especially interesting field for investigation, but at present very little is known regarding its vegetation. Like the Island of Mindoro, it presents two very distinct regions, the northern part, characterized by continuous, dense forests, and the southern part, with much open grass land, with scattered trees, the forests only reaching a luxuriant growth on the higher mountains.

No data is at hand to even suggest a division of the other large islands of the Archipelago into botanical regions. With one or two exceptions, all of them contain both luxuriant forests and large areas of open land. From the little botanical material available from Mindanao, the second largest island in the group, it is evident that this island is the richest of



all in the Archipelago in the number of species and in the luxuriance of its vegetation.

From preliminary observations on the flora of the Philippines it is apparent that the scheme of classification of tropical vegetation proposed by Kurz, in his Forest Flora of British Burma, can not be applied to the vegetation of the Philippines without some radical changes. The distinction between evergreen and deciduous forests is not at all strongly marked in the Philippines. Mixed forests are decidedly predominant and moreover certain distinctive types of vegetation are found here which are not described by Kurz. An intelligent account of the many characteristic vegetative areas found in the Philippines can only be given after a thorough botanical investigation, covering all regions of the Archipelago—work that must necessarily extend over a period of years. Accordingly in the following account but two or three typical vegetative regions are discussed, and to this discussion is added some account of the vegetation found about most towns in the Archipelago, which may prove of interest to many American residents of the Archipelago.

#### LITTORAL VEGETATION.

Three classes of littoral vegetation can be readily distinguished, which may be designated as mangrove, tidal, and strand vegetation. The mangrove vegetation is found in the lowlands about the mouths of rivers, and is characterized by the peculiar habit of the trees making up the forest.

*The Rhizophoraceæ.*—Three genera are found in these forests—tangkal (*Rhizophora*), bacauan or bacao (*Ceriops*, *Brugiera*, and *Rhizophora*), and ligason (*Ceriops*). These mangrove trees are valuable firewoods, and all yield tans and dyes. In the true mangroves little or no vegetation of other kinds is found, except a few epiphitic orchids, ferns, etc. Along the border of the mangrove swamp, and extending generally along the rocky seashores, are found pagatpat (*Sonneratia Pagatpat* Blanco), tingon baguis (*Ægiceras corniculatum* Blanco and *A. florida* R. and S.), tibigi or nigui (*Xylocarpus obovatum* Juss., and *X. granatum* L.), culasi (*Lumnitzera purpurea* Gaud.), pipisic (*Avicennia officinalis* L.), and other less conspicuous species.

The tidal vegetation, which, strictly speaking, includes the above-mentioned species, with the exception of the *Rhizophoraceæ*, would make an extended list, comprising only those species that grow within the influence of the salt water. Here we find such trees as dungon, late (*Heritiera littoralis* Dry.), nilac (*Scyphiphora hydrophyllacea* Gærtn.), dapdap (*Erythrina ovalifolia*), buta (*Excoecaria agallocha*), bignay (*Antidesma* sp.), balic balic (*Pongamia glabra*), bantigi (*Pemphis acidula*), buta-buta (*Cerbera Odollam*), anonang (*Cordia myxa*), banalo (*Thespesia populnea* Corr.), mapola (*Hibiscus tiliaceus*), and calapinai (*Dodonaea viscosa*). Among the smaller shrubs found here may be mentioned dila-uirio (*Acanthus ilicifolius*), lagundi late (*Pluchea Indica*, *Clerodendron*



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*inermis*), etc. The nipa palm (*Nipa fruticans*) thrives along the river banks, forming dense thickets, while extending along the seashores one or two species of screw pine, pandan (*Pandanus*), are found in abundance.

The strand vegetation is confined largely to herbaceous plants, and here we find the coarse grass (*Spinifex squarrosus*), a most valuable sand-binder; associated with this is the grass *Panicum repens*, several species of *Cyperaceæ*, the extensively creeping vines, lampayong (*Ipomoea pes-capræ*), and palang palang (*Canavallia obtusifolia*). Usually, also, butobatonian (*Euphorbia atoto*), a frutescent plant with a milky sap, is found in abundance, and also malabohoc (*Cassytha filiformis*), a yellow twining parasite, with the appearance of dodder. Farther back on the beaches is found lagundi (*Vitex obovata*), a prostrate trailing woody plant with blue flowers, and also the closely related species (*V. trifoliata*), erect, with trifoliate leaves. *Pandanus* is usually found in abundance, and also bosboron (*Scævola koenigii*), an evergreen, succulent shrub with blue flowers which resemble the flowers of lobelia, and balac-balac (*Tournefortia argentea*), a shrub similar in vegetative characters, but with very different smaller flowers. In the wet soil near the sea is also found in abundance the coarse fern *Achrostichum aureum*, and in and near the coastwise forests various species of balete (*Ficus* spp.); lumban (*Aleurites moluccana*), the seeds of which yield a valuable oil; toob (*Bischofia javanica*); lapolapo (*Gyrocarpus jacquini*); calumpang (*Sterculia foetida*), yielding a valuable oil seed; (*Helicteres spicata*), a low shrub; putat (*Barringtonia racemosa*); botong (*Barringtonia speciosa*), various species of *Leguminosæ*, etc.

In the Philippines are found extensive areas of open land covered with grasses which may be distinguished as bamboo jungles and savannahs.

Bamboo jungles are characterized by the great uniformity of their aspect, and by the fact that practically all other classes of vegetation are excluded, probably due to the dense shade. Usually but one species of bamboo is found in the same jungle.

The savannahs as they are found in the Philippines represent two classes; those covered with coarse grasses, and those covered with the smaller species, but intergradations are found. In the former, which usually occupy level country, are found such grasses as *Saccharum spontaneum*, *Arundo* sp., *Manisuris* sp. (*Rottboellia*), *Themeda gigantea*, etc.; in the latter, which are usually found in the hilly country, the grasses are such species as *Imperata cylindrica*, *Apluda varia*, *Eragrostis brownei*, and other species, *Panicum semialatum*, *Chrysopogon* spp., *Chaetochloa glauca*, *Andropogon* spp., and other species.

As in British India and Burma, we find in the Philippines numerous characteristic vegetative areas which are classed by Kurz as "toungyas" or "poonzohs." These areas are found throughout the Philippines where the forests have been cleared away by felling and burning the trees,

and which after yielding several successive crops are deserted, and allowed to revert to a state of nature. Such areas may become covered with a dense growth of coarse grass forming a small savannah; they may develop into dense bamboo jungles, or they may take on a characteristic vegetation comprised of shrubs or small trees, such as balitnon (*Melochia arborea*), polis (*Callicarpa bicolor*, and other species), binunga (*Macaranga tanarius*), taquip asin (*Mallotus Moluccanus*), pandacaqui (*Tabernæmontana pandacaqui*), nino or baneudo (*Morinda bracteata*), various herbaceous species of *Compositæ*, *Malvaceæ*, *Convolvulaceæ*, and grasses such as *Cenchrus echinatus*, various species of *Panicum*, etc. Intermixed with this shrubby growth are generally found young trees and seedlings of such trees as tanag (*Kleinhovia hospita*), molave (*Vitex* sp.), and other species, from which it is evident that in the course of time many of these deserted clearings revert to their former forest condition.

The flora of the higher mountains is exceedingly interesting, and so far as the Philippines is concerned is a subject that has received little attention, although much information of interest will be available when the extensive collection of Dr. A. Loher, from the higher mountains of northern and central Luzon, has been worked up. At the higher altitudes in Zambales, Benguet, and Lepanto-Bontoc, at least two species of *Pinus* are found, occupying comparatively large areas at altitudes mostly above 1,000 meters. These pine forests are practically the only ones in the Archipelago where we find striking resemblance to the forests of the temperate regions, the species of *Pinus* being practically the only species found in the Philippines that are socialistic in growth. Tropical forests are in general characterized by the occurrence of a great number of species in a comparatively small area, frequently 200 or 300 different species being found on areas not exceeding 1 square mile. In those mountain regions where there is an abundant rainfall we find most luxuriant forests; at the lower elevations usually such genera as *Dipterocarpus*, *Shorea*, *Koordersiodendron*, *Buchanania*, *Dillenia*, etc., are represented by numerous individuals; but, as one ascends, species of *Quercus*, *Agathis*, *Podocarpus*, *Phyllocladus*, and *Ilex* are found, and among the shrubs and herbaceous plants are found *Vaccinium*, *Rubus*, *Rosa*, *Anemone*, *Viola*, *Solidago virgaurea*, *Gnaphalaum luteo-album*, *Rhododendron*, *Gaultheria*, *Cnicus*, and other genera typical of the temperate regions.

#### THE VEGETATION IN THE VICINITY OF TOWNS.

As one would expect, the vegetation found about the towns is not particularly interesting, and is characterized by a very large per cent of introduced species and those cultivated for economic purposes. Among the trees may be noted paraiso (*Melia azedarach*), ornamental, medicinal; manga (*Mangifera indica*), the mango; champaca (*Michelia champaca*),

valuable for perfume; ilang-ilang (*Cananga odorata*), the source of a valuable perfume; guanabano, ates, and anonas (*Anona muricata*, *A. reticulata*, and *A. squamosa*), trees of American origin bearing desirable edible fruits; granada (*Punica granatum*), the pomegranate; durian (*Durio zibethinus*, Jolo and Mindanao); bohoi gubat (*Bombax Malabaricum*); boboi (*Ceiba pentandra*), yielding a fiber known in commerce as copac, used for stuffing pillows and mattresses; cacao (*Theobroma cacao*), introduced from America; ratiles (*Muntingia calabura*), from America; camias, balimbin (*Averrhoa carambola* and *A. bilimbi*); naranjas, cajeles, dayap, lucban (*Citrus* spp.), lemons and oranges; banate (*Murraya exotica*); santol (*Sandoricum indicum*), with edible fruits; lanzones (*Lansium domesticum*), edible fruits; iba (*Phyllanthus distichus*), edible fruits; manzanitas (*Zizyphus Jujuba*), edible fruits; casoi (*Anacardium occidentale*), edible fruits; cirihuelas (*Spondias purpurea*), edible fruits; madre cacao (*Gliricidia maculata*), from America; dapdap (*Erythrina indica*), with crimson flowers, cultivated for ornament; caturai (*Sesbania grandiflora*), with large white flowers, which are often eaten as a salad; papaya (*Carica papaya*), the papaw, fruit edible, introduced from America; sampaloc (*Tamarindus indica*), the tamarind; sibucan or sapang (*Caesalpinia sappan*), a valuable dye wood; caña fistola (*Cassia fistula*), with a long cylindrical pod, medicinal; camansiles (*Pithecolobium dulce*), pod, with edible aril, introduced from America; aroma (*Acacia farnesiana*; *Prosopis juliflora*), the latter introduced from America; arbol del fuego (*Poinciana regia* Bojer), introduced and cultivated for ornament, flowers crimson; talisay (*Terminalia catappa*), called by the Spaniards almendras from resemblance of its edible fruits to almonds; guayabas (*Psidium guayava*), from America; lombai (*Eugenia jambolana*) and macupa (*E. Malaccensis*), with edible fruits; melindres (*Lagerstroemia indica*), ornamental; cinnamomo (*Lawsonia alba*); cinnamomo de china (*Aglaia odorata*), ornamental, with very fragrant yellow flowers; cafe (*Coffea arabica* L.), coffee; chicos (*Achras sapota*), fruit edible, introduced from America; chico mamey (*Lucuma mammosa*), fruit edible, introduced from America; cabiqui (*Mimusops elengi*), flowers fragrant, cultivated for ornament; mabolo (*Diospyros discolor*), edible fruit; calachuche (*Plumiera acutifolia*), introduced from America and cultivated for its fragrant flowers; hoyá cruz (*Crescentia alata*), introduced from America; calumpang (*Sterculia fatida*), flowers with fetid odor, seeds yielding a valuable oil; moral (*Morus alba*), the mulberry, introduced from Asia; antipolo (*Artocarpus incisa* L.), with very large edible fruits; nanca (*Artocarpus integrifolia*); niog (*Cocos nucifera*), the cocoanut palm; bongá (*Areca catechu*), the betel-nut palm.

Among the shrubs found in and about towns may be mentioned lumban (*Aleurites Moluccana* and *A. trisperma*), yielding a valuable oil; tuba (*Jatropha Curcas*), introduced from America, commonly cultivated as

a hedge plant and yielding a purgative oil; saguilala (*Codiaeum variegatum*), an ornamental with variegated leaves; tuba camaisa (*Croton tiglium*), the seeds of which yield croton oil; balasbas (*Graptophyllum hortense*), a shrub with usually purple leaves; rosas caballero (*Caesalpinia pulcherima*), with showy red flowers, introduced from America; agho (*Lucaena glauca*), with dense heads of white flowers, introduced from America; coronitas (*Lantana camara*), with heads of yellow, pink, or red flowers, introduced from America; santan (*Ixora coccinea*), with red flowers; sambon (*Blumea balsamifera*), much used in medicine; achiote (*Bixa orellana*), the seeds yielding a red dye, introduced from America; tangantangan (*Ricinus communis*), the castor oil bean; bulac, *Gossypium herbaceum*, *G. perenne*, and other species of cotton; sampaguita (*Jasminum sambac*), with very fragrant flowers; dama de noche (*Cestrum nocturnum*), introduced from America, flowers very fragrant at night; castuli (*Hibiscus rosasinensis*), ornamental; culanta (*Barleria prionitis*), with yellow flowers, medicinal; capanitulot (*Justicia genadrussa* L.), medicinal; tinatanaan (*Phyllanthus reticulatus*), a small shrub with black berries.

The herbaceous plants and very small shrubs found about towns are such species as kasubang aso (*Argemone mexicana*), a plant with showy yellow flowers and yellow sap, introduced from Mexico; balabalamoyan (*Cleome viscosa* L.); olisiman (*Portulaca oleracea*), purslane; escobanghaba (*Sida carpinifolia*); cuacuacohon (*Abutilon indicum*), medicinal, flowers yellow; culutan (*Urena sinuata*), flowers pink; taingon daga (*Oxalis corniculata*); macahiya (*Biophytum sensitivum*); saga or bangati (*Abrus precatorius*), a vine with small red and black seeds, medicinal; colocanting (*Clitoria ternatea*), a vine with blue flowers, medicinal; tighiman (*Cassia occidentalis* L.), an herb with yellow flowers, medicinal; acapulco or catanda (*Cassia alata*), flowers yellow, pods winged, medicinal; catacataca or siempreviva (*Kalanoche laciniata*), a succulent herb; bias pogo (*Ammania vesicatoria*), medicinal; malapoco (*Jussiaea suffruticosa*), flowers yellow, medicinal; salagsalag (*Tricosanthes anguina* L.), medicinal; opo tabayag (*Lagenaria* spp.), vines bearing edible fruits; ampalaya (*Momordica balsamina* and *M. charanta*), vines with edible fruits; tacipcohol (*Hydrocotyle asiatica*), medicinal; lamudio (*Carum copticum*), medicinal; cantutan (*Paderia fetida*), a vine, flowers with a fetid odor, medicinal; hagonog (*Spilanthes acmella*), a composite with yellow flowers, medicinal; bulucan (*Ipomoea hederacea*), a vine with pale blue campanulate flowers, introduced from America; conty (*Solanum nigrum*); sili (*Capsicum minimum* Roxb.); talamponay (*Datura alba*); tabaco (*Nicotiana tabacum*), commonly cultivated; taram hampam (*Limnophila menthastrum*); linga (*Sesamum indicum*), commonly cultivated for its seeds, which yield a valuable oil; tsatsatsatshan (*Lippia nodiflora*), procumbent flowers pink, medicinal; solasi (*Ocimum basilicum*); locoloco (*O. gratissimum*) and

balanoy (*O. sanctum*), all species aromatic, commonly cultivated; su-ganda (*Coleus aromaticus*), medicinal; romero (*Rosmarinus officinalis*), introduced from Europe; pensipansi (*Leucas aspera*), a small herb with white flowers; maravillas or suspiros (*Mirabilis jalapa*), flowers white or more commonly red, introduced from Mexico; cilitis (*Amaranthus spinosus*); apasotis (*Chenopodium ambrosoides*), aromatic, medicinal; buyo (*Piper betle*), the leaves chewed with the nut of the betel palm; gatasgatas (*Euphorbia pilulifera*), extensively used in medicine; luya (*Zingiber officinale*), ginger; dilaw (*Curcuma longa*); bacong (*Crinum asiaticum*); mutha (*Cyperus rotundus*); maiz (*Zea mays*), indian corn; tubo (*Saccharum officinarum*), sugar cane; palay (*Oryza sativa*), rice; dava (*Setaria italica*), Italian millet, cultivated for food; batad (*Sorghum vulgare*), cultivated for food; camotes (*Ipomœa tuberosa*), sweet potatoes; tomatoes (*Lycopersicum esculentum*), tomatoes; potoc potocan (*Physalis peruviana*), somewhat cultivated for its edible fruit; tagum (*Indigofera tinctoria*), indigo; talong (*Solanum melongena*), cultivated for its edible fruit.

Nearly all of the above species are generally found within or in the immediate vicinity of towns, although some are found widely distributed in the more unsettled portions of the Archipelago. The general vegetation of the forest regions is too extensive to attempt to enumerate or discuss in the scope of the present paper, but information regarding many of the timber trees of economic importance can be had by consulting the Appendix.



## Chapter VI.

### FORESTRY AND TIMBER.

[Revised by Capt. George P. Ahern.]

Forest wealth—Forest area—Forest preservation—Forestry Bureau—Destruction of forests—Distribution of forests—Gutta-percha and rubber-tree species—Laboratory—White ants—Logging facilities—Market for Philippine lumber—Primitive logging methods—Gutta-percha in other islands of the Orient—Gutta-percha region of Mindanao—Mr. P. L. Sherman's examination of the gutta-percha regions—Native methods of collecting the gum—Rubber vines—Varieties of gutta-percha—Lumber imported from the United States—Timber tax—Rattan and its uses—The cocoa, the nipa, and bamboo—The future of the lumber industry.

The most evident and striking element of wealth in the Philippine Islands consists of its forests. The official geographic statistics of 1876 fix the forest area at 51,537,243 acres. In 1890 Fernándo Castro estimated the forest area at 48,112,920 acres. But a small part of this vast area is in private ownership, and there are probably between 40,000,000 and 50,000,000 acres of forest land which formerly belonged to the Crown of Spain and by the treaty of Paris became the property of the United States. Pine, cedar, mahogany, and hundreds of other hard woods, valuable dyewoods, and rubber and gutta-percha trees exist in immense quantities.

Upon the military occupation of the Philippines by the forces of the United States it was decided to enforce a system of forest preservation and at the same time utilize the forest products. The principle followed was, instead of cutting all the trees at once and leaving waste land to grow up in a jungle of second growth, to fell only the full-grown trees, leaving the smaller trees to grow and in turn become ready for cutting in a never ending series. The annual growth of these forests is estimated at 1,400,000,000 cubic feet, about three times the cut of lumber for 1900 in the entire United States. At present more than 99 per cent of this annual growth is going to waste.

The Forestry Bureau was organized in April, 1900, and placed under the direction of Capt. George P. Ahern, of the Ninth United States Infantry, an officer of experience and extensive study in forestry matters, who at once brought intelligence and enthusiasm to bear upon the subject and has his work well organized, so that further devastation will not be allowed. His field is an immense one, for the traveler is constantly struck with the large population to the square mile, and the

scarcity of timber close to the main traveled routes and centers of population. Away from these routes vast virgin forests are met, rich in valuable products awaiting the skill and enterprise of the American capitalist. On the Island of Cebú, where there is a population of 290 to the square mile, very little merchantable timber is evident, consisting of a small tract of forest in the northern end of the island. Panay, with a population of 150 to the square mile, is almost denuded of good timber. In Luzón, where the population averages 78 to the square mile, there is no timber near the centers of population. In traveling over the Manila-Dagupan Railway, a distance of 120 miles, there can be seen no merchantable timber, but there are tracts in various parts of Luzón where much valuable timber remains. In the northern end of the islands, in Cagayán and Isabela Provinces, there remains at least 2,000,000 acres of valuable forests. The entire east coast of Luzón, from the northern end as far south as Atimonan, comprising several million acres, is practically a virgin forest. In northwestern Luzón but little merchantable timber is left, except upon the mountain sides above 3,000 feet, where a species of pine (*Pinus insularis*) flourishes, all ages being mingled together. The maximum growth is nearly 4 feet in diameter and more than 100 feet in height. These pines obtain a diameter of 12 inches in about twenty years. Almost every acre of these northwestern mountains is burnt over each year by the savages, but the larger pines seem to survive these repeated scorplings.

In the southwestern islands, extending from Mindoro through to Paragua, a more sparsely settled region is found where the virgin forest has been apparently untouched. In this group are more than 4,000,000 acres of primeval forest, extending from the water's edge to the summits of the mountains. Some cutting has been done, but it amounts to a mere thinning of the edges. This group of islands is celebrated for the great quantities of narra (*Pterocarpus*), or Philippine mahogany, molave (*Vitex*), ipil (*Afzelia*), and calantas (*Cedrela*, the Philippine cedar). Here are found valuable hard woods 4 or 5 feet in diameter, with magnificent clear trunks for 80 feet up to the first limb. As a rule, all over the Islands, the largest trees have not been felled, owing to the lack of facilities for handling heavy timbers. Very little cleared land is found in Mindoro. A vigorous thinning of at least 50 per cent of the present forest growth of Mindoro and Paragua would make them more salubrious than at present.

The Island of Mindanao, with an area of more than 23,000,000 acres, is almost entirely covered by forest. The vast majority of the population of this island is found in coast towns, although a large population of Moros inhabit the region in the north surrounding the Laguna de Lanao. Very little timber has been cut in this island owing to the scarcity of labor and the distance to market. It is safe to estimate at least 10,000,000 acres of virgin forest for this island alone. The southern part of

the island, in the region southeast of Cottabato, is noted for its gutta-percha, rubber, and other gums. Valuable forests are found on the Islands of Leyte and Sámar. The Island of Negros has been cut over rather thoroughly for many years, but now careful attention is given to the protection of the remaining forest areas.

The Forestry Bureau has listed 665 native tree species, of several hundred of which but little more is known than their names. Molave (*Vitex*), ipil (*Azelia*), yacal (*Hopea*), and dungon (*Tarrietia* and *Heritiera*) are remarkable for their durability and strength. The qualities of a few of these woods are well known to the natives, and the specifications for the main timber in house construction carefully provide that the timbers used shall be some of those mentioned. In addition to their value in ordinary construction they have exceptional qualities when used as paving blocks. Two of the bridges of Manila were paved with molave blocks several years ago and, although they have been subjected to the heaviest traffic in the city, thus far not a single block has been splintered. The calantas, or Philippine cedar, is used almost entirely in making cigar boxes. Narra (*Pterocarpus*), tindalo (*Azelia*), acle (*Pithecolobium*), and lauan (*Anisoptera*) are chiefly used as furniture woods. Betis, aranga, and dungon are used for piles, for which there is a great demand in the Manila market. The other important construction woods are baticulin (*Litsea*), batitinan (*Lagerstræmia*), amuguis (*Koordersiodendron*), guiyo (*Shorea*), apitong, panao (*Dipterocarpus*), sacat, balacat, malabulac, and malasantol (*Sandoricum*). For a full list of the Philippine tree species, with their local and scientific names, see Appendix C.

In connection with the Philippine Forestry Bureau there is a timber-testing laboratory, and a systematic series of tests has been inaugurated so that contractors, builders, and others interested in the strength, durability, and suitability of native woods will have some intelligent data to work upon in their selection of building material from the three hundred or more varieties of wood entering the Manila market.

In connection with the laboratory tests, a workshop has been installed in which every variety of native wood obtainable will be worked up in one or more ways to show its most valuable use. This will tend to solve the most difficult problem confronting the forester in the Philippines, viz, the inducing of the logger to take a greater variety of tree species which are at present considered of no value, simply from the fact that they are not well known in the market. A cabinetmaker with one expert assistant, both from the United States, are in charge of this shop, and under their instruction are a number of the best Filipino wood workers and carvers, who will readily respond to such teaching. The famous wood carvings in the Jesuit Church in Manila and the beautiful work done in Paete illustrate the Filipino's skill and artistic sense.

The question of durability and resistance to the attacks of the white

ants and other destroying insects is of great practical importance, but the tests for determining these qualities are difficult, and at best of a negative character. The only practical method is to place pieces of the wood to be tested where the white ant and other insects have free access, and await results. Several attempts have been made to cultivate colonies of white ants and surround them with the various kinds of wood, but so far, owing to unfavorable conditions, the ants have not thrived. Experiments that would give useful results must necessarily cover several years. It is possible to affirm that the white ants did not attack a certain piece of wood under certain conditions, but to be able to say that they would not attack a certain kind of wood under any conditions would require experiments of various kinds covering long periods of time. This should be taken into consideration by persons who wish to have the effect of particular preservatives or paints tested.

The more southern islands, where heavy timber abounds, are well supplied with water courses sufficiently large for driving logs. Many of these streams need a little clearing before they can be utilized. One fine tract of timber near Manila has been protected up to the present time by a small obstruction in a stream that an American logging company would have removed in a short time and at slight expense. A glance at the topography of the islands will show the logger that the average length of the haul to tide water is a short one. A combination of a short line of railway with the wire-cable system of logging would be ideal for a country with a topography such as these Islands present. The methods of logging hitherto employed are very crude, as the carabao has been relied upon as the chief means of transportation. The method of felling trees also is slow and antiquated. Wasteful methods of cutting are evident everywhere, and it is extremely doubtful if an average of 35 per cent of the merchantable timber cut is taken from the forest to the market.

The forest products of the Philippines, like most others, are in a great measure undeveloped, and many fine woods are known only by name. There are a number of species that will attract furniture makers, of which may be mentioned narra, tindalo, camagon, ebano, calamansanay, tucan-calao, guijo, acle, and alintatao. These are found all over the Islands. There are also eleven different varieties of oak, cedar in abundance, teak, and many other species awaiting investigation to bring out their value.

The Pullman Palace Car Company, at no little expense, imported from the Philippines forty-eight logs as an experiment, and it is their testimony that they were the best tropical hard woods that had ever entered their works, and, as is known, their industry calls for the finest woods from all parts of the world.

At present very little cutting is going on in the virgin forests of these Islands, as nearly all the logging operations are carried on in those prov-

inces and islands which have been cut over for many years. It is difficult even to approximate the value of the timber on public lands in the Philippines. Yet it is safe to assume an average stand of about 3,500 cubic feet per acre, inasmuch as the valuation surveys thus far made give more than this estimate of merchantable timber (over 20 inches in diameter) on each acre of the 20,000,000 acres of virgin forests in the Islands. As the Government charges average about 6 cents (Mexican) per cubic foot, it is evident that the value to the Philippine Government of the timber is more than \$100 gold per acre.

By removing this timber under the supervision of forestry officials, each forest tract will gradually improve in utility, and, while realizing the large sum mentioned, the worth per acre of public timber will eventually, and after the great mass of mature and overmature timber is removed, approach its true and permanent value, which will be much nearer \$200 gold per acre than \$100.

The remaining public woodland, about 28,000,000 acres, will average in value not less than one-half that given for virgin forests. A small part of this remaining woodland will be taken up as mineral land and for agricultural purposes. After three centuries of civilization there is found but 6,000,000 acres improved out of a total area of 61,000,000, and it is safe to assume that the Forestry Bureau will have at least 20,000,000 of the 28,000,000 to protect and improve for many years to come.

This area added to the 20,000,000 acres of virgin forest will give to the State an area of 40,000,000 acres of valuable woodland. By diverting the efforts of the timber cutters to the virgin forests, and by a rigid protection of the remaining woodland, the value of the total area will, in about thirty years, be such as is undreamed of to-day by those not familiar with what scientific forestry is capable of accomplishing.

The Philippine market will be a strong one for many years. The Chinese market is always strong, and will continue to be so, as all of lowland China is without timber. The Philippine constructing timber is considered by many engineers in China the best to be had in the Orient. Strong as has been the Chinese market for timber in the past, the future promises even better, as there are indications that foreign energy and capital are securing concessions that will awaken vast enterprises.

Up to the present time the lumbering operations in the Philippines have been very primitive, without any thought or system of forest management. The actual cutting in the forest is carried on almost exclusively by the natives, who either cut and haul on contract or sell the heavier timber to lumber companies or Chinese buyers.

The Forestry Bureau issues licenses to cut timber on public lands, specifying a special district in a province and the amount of timber to be removed. The licensee naturally instructs his workmen to cut the most valuable species which will necessitate the shortest possible haul, so the

loggers pick out the trees they can find, chop and burn them down, taking as long a log as their carabaos can haul and leaving the remainder (often as much as 40 or 60 per cent) to decay in the woods. As a result of this system the forests on many of the islands have been culled for a distance of from 2 to 3 miles back from the coast line and in the vicinity of all the large towns in the interior.

The tremendous weight of the Philippine woods, together with the slowness and expense of hauling with carabaos, has left the more distant forests untouched. The young growth on the lands which have been cut over is largely composed of the inferior species, which is the natural consequence of the native custom of cutting only the most valuable timber.

Unless lumber companies change their methods and cut out the less important species together with the more valuable trees, artificial reforestation of the latter will in time become necessary. In this connection the following quotation from Forestry in British India, by B. Ribbentrop, inspector-general of forests to the government of India, is pertinent:

The treatment of forests of this kind, in view of the natural regeneration of the most valuable species while exploiting these, the only marketable trees the forests frequently contain, is perhaps one of the most difficult problems in forestry. The consequence is that, though often it is a matter of no great difficulty to insure reproduction in this class of forest by protective measures only, it is by no means an easy problem in Indian forestry to promote the production of the more valuable kinds and to prevent the deterioration in the character of the peoplement of the forests, which, without special attention to this point, must, it is very evident, result from the removal of parent trees of the more useful kinds only.

Writers and dealers have long declared that the entire territory which produces true gutta-percha includes only the lower part of the Malay Peninsula, part of Sumatra and Borneo, and the small adjacent islands of the Rhio Archipelago, etc. Java, though very close on the west, has failed to produce even one gutta-percha tree of native growth, though the soil and climate are admirably suited to the same, as is shown by the wonderful growth and vigor of the gutta-percha trees planted under Dutch supervision in Java. Several species of gutta-percha trees are found in Celebes.

The query naturally presented itself as to the eastern boundary of the gutta-percha zone, whether the spread of these peculiar trees stopped somewhere in eastern Borneo or extended into the islands of the Joló Archipelago, and still farther eastward into Basilan and southern Mindanao. Imports of Singapore have shown for years that varying quantities of low-grade gutta-percha have found their way from southern Philippine ports into that city, and the statement was often made that still larger quantities were received at Sandakan, Borneo, for transshipment. But such is the secrecy employed by the Chinese of Singapore and Borneo, and so skillful are they in adulterating and coloring gutta-percha, as well as in changing names, that neither the quantity nor the quality of this

Philippine gutta-percha is known to foreign buyers at Singapore, and certainly none is sold under any Philippine name.

In order to determine whether the southern Philippines contained any true gutta-percha bearing trees, and, if so, their species, location, and abundance, as well as to inquire into the methods employed in securing the gum exported from the southern Philippines, Dr. Penoyer L. Sherman, inspector of the Forestry Bureau, visited, during the latter part of 1901 and the beginning of 1902, the islands and towns of the Joló Archipelago and southern Mindanao and devoted three months to traveling and working alone among the natives. He established friendly relations with them and investigated their pursuits, customs, and natural surroundings. As a result of these investigations, he divided the southern Philippines, on account of their difference in species of trees, methods of collecting the gutta-percha, and ownership of the land, into two gutta-percha producing districts—the Joló Archipelago and southern Mindanao.

Dr. Sherman, often touching at a number of places, went to Buan on the Island of Tawi-Tawi, situated near the middle of the south coast. The village contained but half a dozen houses, but the old datto at its head was very friendly, and, besides giving much information about gutta-percha and rubber, provided a boat and ordered some of his followers to act as guides to show where gutta-percha trees and rubber vines might be found and to aid in securing the gums from both. The start was made at daylight the following day, the small boat enabling the party to enter the shallow water along shore and to penetrate the mangrove swamp fringing the same. From the swamp the land rose abruptly and a forest of magnificent trees began. After a steady climb of several hours the Moros began to hunt for gutta-percha trees, for although most of them had been cut down in that locality they said, "Still anyone who had enough luck could always find one or two."

The first tree found was 63 feet high and rather slender, but as it was in flower and fruitage it was ordered to be cut down. The Moros took a small chisel axe and felled the tree, and running at once to the top with a chisel proceeded to cut a ring entirely around the trunk. When the ring was made in the bark a cocoanut shell was placed beneath and the gutta-percha milk began to run into it. In like manner they ringed the trunk every 2 or 3 feet from one end to the other and a cocoanut shell was placed under each ring.

In shape the leaves resembled *Dichopsis gutta* (the best gutta-percha), but the characteristic bronze color of the under part of the leaf was lacking, and the fruit was different both in color and shape. The milk as it ran from the tree was much slower in coagulating than that from the *Dichopsis gutta*, and when coagulated the product was more elastic. Nothing like this species was observed in Singapore or Java, and it will probably be found to be a new one. After half an hour milk had almost ceased to flow, and the Moros scraped that which had partially coagulated

on the trunk into the shell, poured the contents of a dozen and a half shells into one, inverted a half shell over this, cemented the edges with mud, and putting shells and ax into a basket said they were ready to hunt for another tree.

This was found after a half hour's tramp, and a tree over a hundred feet high and of the same species was also felled and the milk collected as before. Inquiries as to the best place for finding gutta-percha trees elicited the reply that the deeper into the forest the search proceeded the more abundant the trees became; that in fact there were gutta-percha trees everywhere in the interior.

The rubber vines found were twisted around on the ground for some distance and then ascended high trees. The bark was black and very rough, and on being tapped with a bolo gave a quick flow of milk, which ceased almost as soon as it began and coagulated after standing a minute. Though the leaves were larger than those of *Willughbeia firma*, and the bark somewhat rougher, the rubber resembled the product of this species very strongly and should compare favorably with the best grade of Borneo rubber. To secure the milk from the vine the Moros jerked most of the vine down from the tree and tapped it with a bolo in many places, arranging their cocoanut shells so that the milk that did coagulate on the bark would run into them. When the milk ceased to flow the coagulated strings of rubber were pulled from the bark, thrown into the milk in the shells, and all worked into a solid mass of rubber very elastic and quite tough and hard. This method is very wasteful, for while the vine is killed the greater portion of the rubber is lost.

Treating all southern Mindanao as a whole, the central point of the gutta-percha trade is Cottabato, which is a regular port of call for several Sandakan and Singapore ships, as well as the geographical center of the south coast and the Rio Grande Valley region. All the gutta-percha is collected here and sorted and packed for exportation. The towns and villages along the coast, west and east, from whence the gutta-percha is shipped to Cottabato, can be easily enumerated and are for the most part accurately given on the maps; but to name and even approximately locate the forest lands of the interior (gutta-percha never being found directly on the coast) from which these towns secure their gutta-percha, is difficult, as all the maps are inaccurate and most of them positively misleading. The extent of territory in which the gutta-percha tree is found is surprising. The natives report, and no one has shown to the contrary, that all of the mountain region of southern Mindanao contains gutta-percha. Much of course has never been explored by Americans, and much also is never visited by gutta-percha collecting natives. Still these trees have been found stretching out in all directions through the forest belts of the interior as far as anyone has gone, and only time and much exploration can determine their true extent and number. The fact that gutta-percha is being collected from almost as far as Zamboanga on the



West to Dávao on the east gives proof of the extent and number of these trees; and in none of the towns visited on the south coast were found Chinese or Moros who were not engaged in the gutta-percha business.

There are at least two kinds of gutta-percha which enters the Cottabato market—that brought from the various coast towns in small quantities by native boats, and that in large shipments from the great region drained by the Rio Grande which is all controlled by Datto Piang.

Dr. Sherman, an inspector of the Forestry Bureau, was invited by Datto Piang to visit the forests south of his town in order to see live gutta-percha trees. He left Cottabato January 21, 1902, going up the Rio Grande to Piang's rancheria at Kudarangan. The Datto met him at this point and fitted him out with a boat and a large crew of Moros. The journey upstream took two days, with three polers and six paddlers working hard. The general direction was southeast and then southwest. Upon arriving at the headwaters of the west branch of the Rio Grande they struck inland for half a day where they were met by six natives of the Tiruray tribe. They had met the party by order of Piang, and with them and the boat's crew the party pushed into the forest for a day and a half before finding a gutta-percha tree. The datto had insisted that his people always tapped and never felled the trees from which the valuable gum was extracted, and when the first good tree was found the natives were instructed to tap it in order to secure a sample of the gutta-percha. They produced a chisel ax, almost identical with the one used in Tawi-Tawi, and proceeded to "tap" the tree in one place so effectively that in about an hour it toppled and fell, and the natives then proceeded to ring the bark and collect the milk.

The leaves of the tree were of a copper color below and green above, and while the general shape and appearance of the leaf showed it to be of the genus *Dichopsis*, still the intense color of the underside, as well as the too pronounced veining indicated that it was neither *Dichopsis gutta*, *barneense*, nor *oblongifolium*, nor could it be identified with any of the Singapore, Sumatra, or Java species. The tree was growing on the mountain side some 50 feet above the waters of a small mountain stream. The soil was rocky, and the roots buttressed heavily and high above the ground.

From personal observation and information it appears certain that the real gutta-percha gatherers all belong to the mountain or pagan tribes of southern Mindanao. They exchange the gutta-percha for cloth and weapons with the lake and river (Mohammedan) Moros or visiting Chinese traders, who in turn sell it to the Chinese firms in Cottabato for exportation to Singapore. The system is well organized in spite of the fact that the business has developed since American occupation.

From all the information that could be gathered it appears that gutta-percha was discovered at least twelve or eighteen years ago in various places, and that the only method of collecting the gum involves the

destruction of the trees, though experience has shown that they can be tapped year after year without destroying them, but this will require a supervision that as yet it has been impossible to inaugurate. Almost all rubber and gutta-percha from the Philippines eventually arrives in Singapore. It is interesting to note in connection with the official statistics from Singapore for the year 1902 that the Philippine gutta (3,596 piculs) is rated as high-grade gutta.

Until the present time it has been impossible to cut anything like enough timber for the actual necessities of the Islands, and much lumber has been imported from Australia and the United States in order to enable the Government to build barracks and quarters for the troops, as well as for private consumption. The amount of lumber used per capita is less than 1 per cent of the corresponding amount used in the United States, notwithstanding the fact that rents are abnormally high in Manila and the supply of houses does not begin to equal the demand. There is a present demand for millions of feet of lumber which is now rotting in the forests, but which can not be carried to market. The total amount used, including importations, is much less than the annual forest growth of the single Province of Cagayán in northern Luzón.

The Philippine Government has divided the timber of the Islands into six different grades or groups and charges a fixed rate per cubic foot (Spanish) for all timber taken from the public forest. This charge is as follows:

[Cents, Mexican currency, per cubic foot.]

Superior group-----	14
First group-----	10
Second group-----	8
Third group-----	3
Fourth group-----	2
Fifth group-----	1

The lumber industry in the Philippines is one full of attractive interest. The material to work upon is all but limitless. There is a market at hand that will absorb all possible production for many years to come, and as the field of operation in many parts of the United States has become limited by the fact that much of the territory has been cut over and no effort made to protect the remaining forest growth, there will be a movement toward the Philippine forests. The new conditions will attract rather than repel investors, and when the Government restrictions and the exigencies of the new industry become adjusted in a proper manner, portable railways, driveways, machinery for handling heavy timbers, sawmills for preparing the lumber for market, and even mills for working up this lumber into useful forms will become an important industry and contribute not only to the revenues of the Islands, to the profit of the lumbermen, but to their development and civilization.

Aside from lumber and gums, of which mention has been made, there

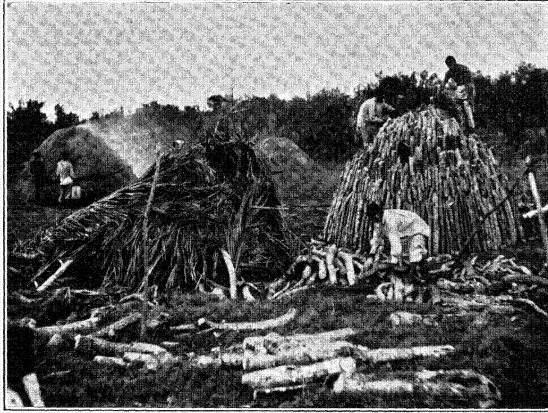
are other forest products worthy of consideration which enter largely into the domestic economy and native industries of the Islands.

The bejuco, or rattan (*Calamus* spp. and *Dæmonorops* spp.), is abundant and indispensable. The willow-like stem of the vine, split into strands, takes the place of iron in native structure work. In the vast majority of the houses in the Archipelago not a nail or screw is employed, and bejuco, with the addition of a few wooden pegs, holds the timbers together. The same material is also used in tying on the roof of nipa thatch, and in holding in place the strips of bamboo that serve as flooring. The rude carts of the country are fastened together with the bejuco, and it also plays an important part in boat construction. It is woven to take the place of springs in the bed, and is the material out of which are manufactured those enormous chairs which make the traveler on a Pacific liner realize that at last he has reached the land of laziness.

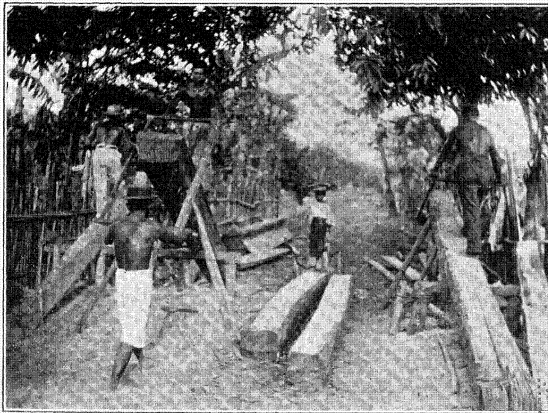
From the "buri" tree a material is obtained which in appearance somewhat resembles the palmetto. The natives of Romblón employ this fiber in the weaving of their sleeping mats, which are indeed one of the wonders of the country, being dyed in the most delicate colors and having a texture as firm and soft as silk.

There are three trees also, which, although they yield no lumber, in our sense of the word, yet are counted among the necessities of life among even the most primitive of the island folk. They are the cocoa, the nipa, and the bamboo.

The cocoa palm (*Cocos nucifera*) is the staff of life in all tropical islands and is a beautiful tree giving a distinctive appearance to the coast landscape, for they flourish close to the shore and grow luxuriantly in the lowlands. Almost every part of the tree is utilized. The coarse fiber of the bark is woven into the well-known cocoa matting, and is used for all sorts of rough purposes, just as burlap is used in the United States. The leaves serve for thatching, and the strong midribs make excellent brooms and twine. The large central leaf bud is cooked and eaten, tasting, it is said, much like cabbage. In the more southern Islands the flower bud is often sliced off at the tip and the sap collected in a small bamboo tube hung under the cut. It is this sap, either sweet or "white," as it is called, or fermented and turned red by the addition of a certain bark, which is the "tuba" or palm wine about which so much has been said. Many men have for their sole occupation the collection of tuba, which is used by the natives much as pulque is used in Mexico. The collection is usually done at nightfall, and the "malinguete," as he is called, dressed in a breech clout, and carrying over his shoulder a large cane of bamboo to hold the sap collected from the small canes on the trees, climbs tree after tree. These men, by their constant climbing, usually attain a magnificent development of the leg muscles, and it is a sight to be remembered to see one of them walking up the stem of a 60-foot tree with apparently the greatest ease.

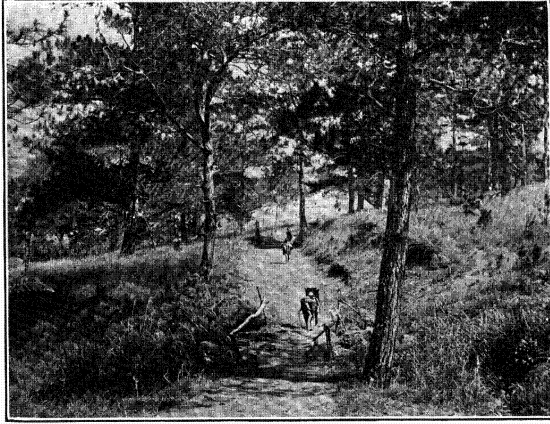


CHARCOAL MANUFACTURING IN ZAMBALES PROVINCE.

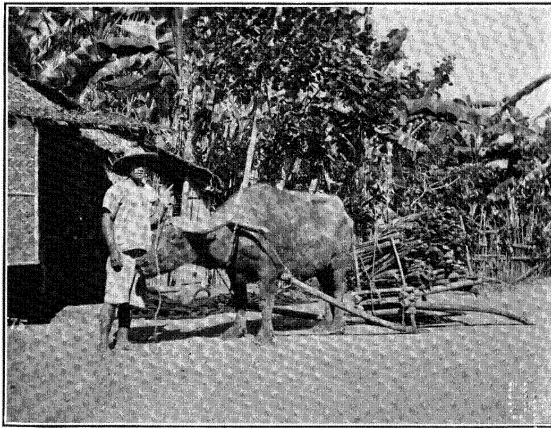


TYPICAL LUMBER INDUSTRY IN THE PROVINCES.





PINE FOREST IN BENQUET.



HAULING FIREWOOD.

100

The fermented tuba allowed to sour in the sun forms vinegar, and this same sap when boiled down yields a sugar which compares favorably with maple in its delicious flavor. Unless the bud is cut off for tuba a cluster of cocoanuts is soon formed. When these have attained full size and the meat is ready to form they are filled with delicious water, and to go at daybreak and drink the contents of a young coconut with the dew on the husk is a revelation to those who imagine there is no cold water in the Tropics. The natives eat the soft meat of the young nuts, but when it reaches maturity, as seen in the markets in the United States, it is never eaten, but made into copra. This is the most valuable product of the tree, and is one of the standard commodities of the islands of the Pacific, the Philippines exporting more than \$3,000,000 worth annually.

A small cluster of coconut trees is sufficient to keep a native family in luxury. The tree must be planted and guarded against the browsing of cattle for four or five years. After that, nature and the Chinese trader will do the rest. At the age of 8 or 10 years the tree begins to bear, and it can be relied on to produce on an average of 100 nuts a year. Two hundred trees can be grown on an acre, and the life of a tree is almost a century. As the nuts sell on the trees at a peso a hundred, it can be seen that the proprietor of a large grove of coconut trees has an assured income, and the wear and tear on the human system of sitting in the shade and watching the crop mature is not especially severe even in a tropical country. The oil extracted from the dried coconuts or copra is one of the finest vegetable oils and serves as the basis of many of the toilet soaps whose advertisements occupy such a prominent place in magazines and periodicals.

The nipa (*Nipa fruticans*), which, like the coconut, is also a palm, grows in low, moist ground, and it is not an exaggeration to say that 90 per cent of the dwellings in the Philippines are roofed and walled with nipa leaves. In other words, the nipa swamps of our eastern islands are the shingle mills where nature prepares roofs and siding without the aid of hissing steam and buzzing saws.

The use of the bamboo (*Bambusa* spp.) is even more universal than that of nipa. The bamboo is really not a tree, but a gigantic grass, like the sugar cane, attaining at times a height of 100 feet. Its uses are almost innumerable. The river men depend on it for rafts, cabinet-makers employ it in the manufacture of furniture, and carpenters build their scaffolding of the light, strong lengths. Bridge builders in the mountains need nothing but rattan (*Calamus* spp.), bamboo, and a bolo, and with these will throw a bridge over swift currents and yawning chasms. It is cut and made into water pipes, buckets, cups, spoons, and many other household utensils, and with the strips, which have a sharp cutting edge, the savages tip their spears and arrows. When stripped



into fine fibers, it is woven into the finest hats and bags to be found in the country.

Thus the actual wealth and the possibilities of profitable investment by exploiting the almost limitless forest resources of the Philippines present an attractive picture. The difficulties that have hitherto guarded these treasures are not insuperable, and the time is not distant when they will prove to be a source of income to the Government and a profitable field of investment. Modern methods, labor-saving appliances, and cheaper freight charges will deliver these valuable products to market to the advantage of all concerned.

## Chapter VII.

### AGRICULTURE.

[Revised by Dr. Frank Lamson-Scribner.]

Varieties of soil—Varieties of plant life—Rainfall—Rice a staple crop—Varieties of rice—Work of Bureau of Agriculture—Rice cultivation pursued with care—Methods employed by natives—Work done by hand—Ravages of locusts—Modern machinery—Corn—Sugar industry—Crude methods which obtain—Varieties of cane planted—Soil requisites—Primer on the cultivation of cane—Lands adapted to the growing of cane—Land titles—Sorghum—Tobacco—Spanish monopoly—Manufactures of tobacco—Tobacco lands—Coffee plantations destroyed—Soil suited to coffee growing—The cacao—Philippine cacao unsurpassed—Varieties of cacao—Gum chicle—Stock raising—Grazing lands—Water supply—Forage grass, zacate—Cogon—Native horses—Ilang-ilang—Cocoanut—Sesamum—Lumbang—Jatropha Curcas—Peanut—Nutmegs—Cinnamon—Indigo—Other dyes—Leguminous plants—Starch-producing plants—Fiber plants—Rattan—Bamboo—Vegetables—Fruits.

As the Philippine Archipelago lies between the fifth and twenty-first degrees of north latitude, with a great range of elevation and variety in the composition of soil, it necessarily presents marked variation in its vegetation, both in the forest and in the cultivated field. A crop report, if in any measure complete, would contain the names of many crops entirely unknown to the more temperate zones of the United States, while such staples as wheat, corn, and oats would scarcely appear at all. In general, the flora is tropical, while in the southern part it becomes equatorial. There is also a marked difference in the vegetation between that produced on the Pacific coast and that of the China Sea. In the former region the rainfall is both greater and more frequent than in the latter, and as on the eastern coast the mountain ranges crowd close to the sea its agricultural area is limited.

Next to hemp, which has been treated elsewhere, rice is perhaps the most important crop raised on the Islands and constitutes the staple and almost exclusive food of the natives, as indeed of most of the uncounted millions of the poor people of the entire Orient, and there is practically no limit to the demand.

Rice is said to have in the East not less than 1,300 different local names, and it is said that Bengal alone has displayed 4,000 distinct forms of rice, which differ as to color, shape, size, etc. In the Philippines over one hundred varieties are cultivated. These are divided into two groups

—the highland rice, grown where irrigation can not be used, and the low-land, that depends upon irrigation. The yield from seed varies from 40 to 100 grains of crop to one seed, a fifty-fold increase being considered a good average. A family of five persons will consume about 250 pounds of rice per month, being used in almost every native dish, and takes the place of bread. The unhulled rice is fed to horses, cattle, and fowls.

The condition of the rice industry is such that it requires the earnest attention of the Government, for, owing to the ravages of war, the loss of the carabao, and the primitive and laborious methods that have hitherto been employed, the crop has not been sufficient to meet the demand, and large shipments have been made from China in order to feed the people. The deficit for the year 1902 amounted in value to something like 4,000,000 pesos. It is strange that with its fertile soil and the abundant supply of water both from the clouds and from streams the Islands have never been extensive exporters of rice.

The Agricultural Bureau of the Philippines has made close inquiry into the methods followed by native planters and has endeavored to improve the situation by the introduction of some new and productive varieties of seed rice, but the root of the evil lies chiefly in the methods of cultivation followed. The importance of this staple crop is such that it is the purpose of the Bureau to make a thorough investigation of the various methods now in vogue in the Orient in rice culture, and especially of the methods which permit French Tonquin to produce a sufficient quantity to provide for the wants of its dense population, and to permit an annual exportation valued at \$18,000,000, gold.

Rice growing is one of the few occupations which the natives pursue with extreme care, though the crude appliances employed do not permit great profits to accrue to the cultivator. The Philippines, like most oriental countries, have pursued the policy that human labor is cheaper than machinery, and therefore everything is done by hand. With the exception of land cultivated by the Igorrotes, but one crop is produced in a year, and that is grown during the rainy season. The land is allowed to remain idle during the dry months and grows up with weeds, Bermuda grass, etc. When the rain commences the water is allowed to stand in the paddies, and when the ground becomes thoroughly saturated with water it is plowed, carabaos being the draft animals employed. The plows are very crude, being little more than a forked stick to which is attached a cast-iron point. The first plowing simply scratches the sod; the second, at right angles to the first, breaks it still more, though there is no deep plowing or turning over the soil, and after plowing several times the land is harrowed with a bamboo harrow, this implement being constructed of the larger basal joints of a species of bamboo which has numerous stout branches at each node, these branches being cut off 10 or 12 inches from the joint and the several pieces of bamboo lashed together with rattan.

The rice is first propagated in specially prepared paddies and from these to the paddies in which it is to be grown, a few young plants being thrust into a hole made in the soil and the earth slightly packed around the plants, which are planted a foot or two apart each way, all this work being done by hand—imagine an American farmer transplanting 10 acres of sprouted wheat by hand.

All the work of harvesting is also done by hand, the heads being gathered one by one, and when tied into bundles is known as “palay”—that is, unhulled. Much rice is bought and sold in this condition, especially in towns where there are large rice warehouses and rice-hulling machinery. Practically all the rice for local use, however, is hulled by hand by pounding the palay in great mortars, this work being mostly done by the women of the household, who pound out what is needed for food day by day, or, at most, an amount that will last for a week or two. In and about Quiangán, Nueva Vizcaya, the Igorrotes, by artificial irrigation, produce two crops each year, their rice being of superior quality, with larger, practically awnless heads and larger grains than are seen elsewhere.

The locust is a formidable enemy to rice, sometimes destroying an entire crop, causing great suffering among the poor.

It is the opinion of the Agricultural Bureau that rice cultivation can profitably employ modern machinery.

The soil can be plowed, the grain can be drilled, and the crop harvested and threshed as is done in the fertile rice districts of Louisiana where profitable returns are secured by these methods. There can be no question but that through the object lessons constantly given by the Government farms the condition of rice culture will constantly improve, to the marked benefit of the manner of life among the people.

Corn is a cereal which sometimes gives abundant crops, its flour making excellent food and the Visayans make an alcoholic drink from the grain, which they call “pangasi.” It is indigenous to America, whence it was brought by the Spaniards. The natives at first looked upon it with indifference, until on account of the frequent loss of the rice crop, they became accustomed to its use, and in time its cultivation became quite general throughout the Archipelago, especially in those regions where the soil is not altogether suitable for the cultivation of rice, as in Cagayán and Isabela.

The importance of the sugar industry in the Philippines is generally recognized. The splendid results that have been obtained in Hawaii for many years have focussed attention upon the sugar possibilities of the Philippines. In 1900 the Islands produced all the sugar required for domestic consumption and a surplus for export which amounted to a trifle over 60,000 long tons. With the exception of hemp, this industry gives employment to more of the rural population than any other branch of agriculture. The fact that the area devoted to cane has been

reduced, owing to vanishing profits, has entailed suffering in the rural districts that has extended far beyond the landed proprietor or owner of a sugar estate. Abandoned cane fields and idle mills throughout the Archipelago indicate a depression of such magnitude that active steps are being taken by the Government to rehabilitate the industry and make it show a balance on the right side of the ledger.

The poor state of production in which the Archipelago stands with relation to other countries, depends, in a large measure, upon the deplorable system of cultivation. In the Philippines there is scarcely known, much less employed, a single one of the thousand well-perfected agricultural machines, the use of which in other countries is general. For this reason the work is done in an imperfect manner. There is, in fact, no system of agriculture, properly so called, and the greater part of the people have no idea of what agriculture really means. The carabao is used to haul a wooden plow (as old as the pictures on the temple walls of Egypt) through the ground. The plant receives but little cultivation, and is allowed to take care of itself until harvest time, and the same crude, slipshod methods are employed in extracting and crystallizing the juice of the cane. The cane is crushed by being passed through mills or cylinders of wood or stone, with intermeshing teeth, which extract only about 70 per cent of the juice, which is collected and boiled in open kettles, a little lime being added to purify it. When the boiling has reached a certain point it is passed to a second kettle, where the boiling is continued until it reaches a certain stage, recognized by those who are considered experts in the business. It is then poured into conical molds, which are placed upright so that the molasses may drain off. These molds are placed over small jars where they remain until the sugar is formed, it being then free from molasses.

It will be seen, therefore, that there is opportunity for vast improvement in these methods, and something has already been accomplished. The cane grown has been confined to the green and yellow varieties of probable Japanese origin. These canes, though rich in sucrose, are generally small and insufficient in tonnage yield per acre. Furthermore, whenever there is a steady decrease in size from lack of proper cultural methods, the deterioration is accompanied by an increase of fiber, which represents a further loss at the mill. The many useful striped, rose, and purple canes that have contributed to bring Hawaii to the fore as the most prolific and profitable sugar region in the world, have not yet been cultivated in the Philippines. Through the enterprise of Capt. George P. Ahern, Chief of the Forestry Bureau, an importation of Hawaiian canes has been made, and by the rapid propagation and further introduction by the Bureau of Agriculture distributions of these improved varieties will be made to planters.

With the possible exception of tobacco, there is no staple agricultural crop where the physical condition of the soil plays so important a part

as it does in the growing of sugar cane. It is a plant that, by virtue of its great size and rapid growth, not only drains heavily upon the fertility of the soil, but its shallow root system and restricted area for each plant demands that the mechanical condition of the soil be such as to facilitate in every way the full exercise of the root's functions. In all regions and in all sugar-producing countries a strong, deep, argillaceous, or slightly calcareous soil has always been found best suited to meet these requirements.

In the sandy, sedimentary, alluvial soils along the seacoast, or in rich mountain valleys heavily charged with the humus in which the cane rejoices, phenomenal crops are often taken, but for long-continued cropping and with a minimum of restoratives, the soils first mentioned are those which have longer withstood the crucial test of time. Such lands as these abound in the Archipelago and often extend for miles along the lower and easily cultivated foothills, and offer a more inviting field of operation than many of the apparently more alluring valley lands along the coast. For the purpose of improving the management of existing sugar plantations and the intelligent establishment of new ones, the Philippine Bureau of Agriculture has published, in both English and Spanish, a primer on the cultivation of sugar cane which treats in a simple, clear manner of such important subjects as soil conditions and fertility, preparation of the soil, selection of seed cane, planting, after-treatment, harvesting of the crop, management of the stubble, drainage, irrigation, etc. This work, in connection with the instruction given in agricultural schools, the example of proper cultivation as demonstrated on the Government farms with the introduction of modern machinery, both farm and manufacturing, will in a short time produce a marked change for the better in the sugar returns from the Archipelago. It is impossible to state how much land is adapted to the growing of cane, or how long it will take to develop the industry before the Philippines become one of the important sources from which to draw sugar. However, with a soil and climate second to none, a reasonable supply of labor, and especially if the Congress of the United States should lower the present rate of duty upon sugar imported from the Philippines, the development of the industry will be constant, if not rapid, and may well engage the attention of those interested in sugar production.

Under the present Government, means have been provided for perfecting and transferring titles; the Philippine Commission has enacted legislation, subject to the approval of Congress, by which Government land to the amount of 2,500 acres may be acquired by a single corporation, and it is thought that all of these influences will contribute to the rehabilitation of the sugar industry. Its growth, however, will, under the most favorable circumstances, be so gradual that the sugar growers of the United States, both of beet and cane, need have no fears of competition so serious as to endanger their business. There is an abundance

of room for both, for it will be many years before the annual consumption of the United States can be raised on American soil.

Although sorghum, or batad, has given excellent results in the United States and elsewhere when cultivated for sugar or the production of alcohol, it is used in the Philippine only for fodder.

Tobacco leaf, cigars, and cigarettes have formed a considerable item in the exports of the Philippine Islands. Until the year 1882 the Spanish Government had a monopoly of the tobacco industry, and much of the discontent that existed up to that time among the natives was due to the tobacco-monopoly laws which were on the statute books and the vigorous manner in which the officials enforced them. The natives in those provinces where tobacco could be produced advantageously were compelled to plant a certain amount of land in tobacco, and the entire product of the Islands was required to be delivered to the Government warehouses, where payment was made at prices arbitrarily fixed by the Spanish Government. Each unmarried man who cultivated tobacco was required to set out 4,000 plants each year, and each married man was required to set out double that number. There were Government inspectors who supervised the planting, cultivating, and harvesting of the crop, and who also required that it be packed in a certain way and shipped at a certain time to the Government warehouse.

The natives were not permitted to use the tobacco which they grew. Penalties were provided for those who smoked cigars and cigarettes, and it was not an uncommon thing for a native engaged in tobacco raising to be put in jail for smoking a few leaves which he had raised himself and which he had rolled into a crude cigar or made into a cigarette. The price paid by the Government for tobacco under the monopoly was about one-half what is now paid. During a good portion of the time the monopoly was in force, particularly the latter part, payment was made in scrip, redeemable at the option of the Government. For a number of years this scrip was paid out with a fair degree of promptitude, but after a time payment was deferred for so long a period that it often sold for one-third of its face value.

The injustice worked through the tobacco monopoly in the Philippine Islands became so great, and the natives had become so incensed over the unjust treatment accorded them, that finally the Spanish Government was compelled to abandon the monopoly, which was done by royal edict in December, 1882.

The tobacco business is now conducted as any other industry in the Islands and large factories have been erected for the manufacture of cigars and cigarettes. This is one of the important industries of Manila, which practically controls the manufacture and export of tobacco, and many people are thereby given employment.

From its monopoly of the tobacco industry the Spanish Government derived a revenue which for several years amounted to about \$4,000,000

annually. The number of officials employed in this branch of the service alone exceeded 400. The cutting off of this source of revenue proved so serious a blow to the finances of the Islands that it was found necessary to increase taxes in other ways. License fees were increased, the cedula or head tax was made heavier, and an export tax on leaf and manufactured tobacco was put in force.

The cigars manufactured in Manila are sold at a very low price. The average price lists of the various manufacturers in Manila show a range of from \$10 to \$75, silver, per thousand. The ordinary cigar of Manila, of fair quality, sells for about \$4 (silver) per hundred, or less than 2 cents apiece in United States money. There is but little tobacco and few cigars shipped from the Philippines to the United States. Freight charges, customs dues, and internal-revenue taxes so increase the cost that they can not compete with American-made cigars. In China, Japan, and India, Manila cigars are used almost exclusively, and there is a constant increase in the export of both leaf and manufactured tobacco. Since August 13, 1898, the date of American occupation, to June 30, 1902, cigars were exported to the following countries from the Philippines:

	Value.
United States .....	\$22, 453
United Kingdom .....	1, 617, 559
China .....	855, 753
Hongkong .....	893, 534
Japan .....	107, 543
British East Indies .....	558, 848
Australasia .....	790, 900

Smaller amounts were also exported to many other countries, making a total value of \$5,399,759.

Since the abolition of the monopoly the tobacco industry has increased in all regions to an extraordinary degree, both in quantity and quality of the product. As a result of the Habana school of gathering, curing and manufacturing the leaf, the product has become popular throughout the country. A full knowledge of the fermentation or preparation of the leaf is still lacking, or perhaps this work is carried out under adverse conditions, so that the leaf has not acquired the full aroma and strength of the Havana leaf, but the different processes are constantly being improved.

When the Philippine Commission made a journey up the Cagayán Valley in Luzón (1901), it was informed that practically all the good tobacco lands were under cultivation, and among the natives the "good land" was understood to be those parts fertilized annually by the overflow of the river. It was stated that the other land was not considered first class because it would only produce tobacco for ten or twelve years without enrichment, the subject of fertilizing never having received any attention from the planters of that region.



The qualities which determine the price of tobacco are combustibility, strength, aroma, fineness, elasticity, color, and uniformity. Intelligent and experienced direction by practical men, with scientific aid in the matter of seed selection, instruction in cultivation, curing, and marketing, such as will be furnished by the Bureau of Agriculture, will enhance the quality and value of Philippine tobacco until it will become second to none, for already the leaf from the Provinces of Isabela and Cagayán compares favorably with that of the Vuelta Abajo district of Cuba. That from the Visayan Islands is coarser, more intense in color, and stronger in taste, while the leaf from the Province of Nueva Écija is fine but rather bitter in flavor and yellow in color.

Don Rafael Maramag, the president of Ilagan, states, in the Commission's report for 1901, that the tobacco crop for the current year was very good. That in the Province of Isabela, the land was for the most part in small holdings of from 1 to  $1\frac{1}{2}$  hectares, and that a hectare of tobacco land would produce in an ordinary season about 60 bales of tobacco, worth \$6.50, Mexican, per bale, of which over one-half would be profit. So the crop is an extremely profitable one, especially for families with small holdings, where much of the labor can be performed by the women and younger children of the family. Tobacco growing on a large scale would afford opportunity for the employment of much improved and labor-saving machinery.

Coffee has been cultivated in the Philippines for more than a century. It was first planted in the Province of Batangas and the same sad story of neglect and deterioration that has been told as to other products of the Islands, is repeated in the history of coffee culture. This crop has suffered from lack of proper transportation facilities, for competition in all crops is now so active that none of them can overcome the handicap of high freight charges, and every neglected field is a silent argument for better roads and harbors. For many years but little attention has been paid to coffee growing, notwithstanding the fact that the neighboring Island of Java became wealthy through coffee and set the standard of excellence for the world.

The remarkable extension of coffee planting in almost every part of the torrid zone has so increased the supply that only the better qualities can command remunerative prices, and this fact lends hope to the future development of this industry in the Philippines, for its berry compares favorably with that of Java or Martinique, and there are certain favored localities which produce coffee which, according to the judgment of experts, can be compared only to Mocha.

The red fertile lands of the mountain sides, resembling the best coffee lands of Porto Rico, with a porous subsoil, where the rainfall is abundant and regular, with an ideal climate for the coffee tree, is an alluring prospect. Until a few years ago this was an important industry in various parts of Luzon and other islands of the groups. In 1891 an insect made

its appearance in the coffee plantations which destroyed the trees, and practically all of the big coffee plantations have now been abandoned. When the industry was flourishing over \$4,000,000 worth was exported in a single year, while since the date of American occupation to June 30, 1902, but \$23,102 worth found its way to foreign markets. There is no question that with scientific attention directed to the matter, means would be found to overcome the ravages of this insect and enable trees to grow and render tribute to the wealth of the Islands.

As coffee is one of the most important of the tropical commodities imported into the United States, which under no possible condition can be raised in any of the States, it would seem to be good policy to direct legislation so that the market of the United States should be the market where its insular possessions could dispose of their surplus products. In 1902 there were imported into the United States 1,090,636,832 pounds of coffee, valued at \$70,919,257.31, all of which was entered free of duty. It has been urged in the Congress of the United States that a duty be placed on coffee imported from foreign countries, and allow it to enter free from the insular possessions. Under the stimulating influence of such a policy, applied not to coffee alone but to rubber, hemp, sisal grass, gutta-percha, copra, cacao, dyewoods, etc., and other products of the field and forest, of which the United States imports annually to the value of from \$150,000,000 to \$200,000,000, and all which is now on the free list, Philippine agriculture would be revolutionized and the Islands enabled to rival Java in the wealth of their products.

An especially fine coffee is grown on the mountain regions of Benguet and Bontoc and in the Province of Lepanto. The trees yield heavy crops, and unhulled coffee sells readily in Manila at \$35, Mexican, per cavan, for local consumption or for shipment to Spain, where the Philippine berry is highly appreciated. The coffee comes into bearing in Benguet in three years, and there is no region in the United States which has a more healthful or delightful climate than is afforded by the Benguet highlands, where a white man can perform heavy field labor without excessive fatigue or injury to health.

Coffee can be grown on most of the islands where there are timbered gulches or ravines and up to an elevation of 2,000 feet. The machinery required for the proper marketing of coffee is so simple and cheap that it figures very little in the expense, and even the poor natives could raise and market coffee with but little instruction.

There are few sights more beautiful than a well-conducted coffee plantation in full bloom. Neither the blush of the apple blossom, the snowy plum, nor the pink of the peach can compare with the exquisite beauty of the coffee tree, where nature has excelled herself in combining those rare qualities which delight the eye, tickle the palate, and render good return for the labor and capital invested.

The cacao grown in the Philippines is of such excellent quality that

there is keen rivalry among buyers to procure it, at even an advance of quite 50 per cent over the price of the export grades of the Java bean, and this notwithstanding the failure on the part of the local grower to "process" or cure the product in any way. In parts of Mindanao and Negros, despite ill treatment or no treatment at all, the plant exhibits a luxuriance of growth and wealth of productiveness that demonstrates its entire fitness to be considered a most valuable crop in those regions.

The importance of cacao growing in the Philippines can hardly be overestimated, as recent statistics place the world's demand for cacao (exclusive of local consumption) at 200,000,000 pounds, valued at more than \$30,000,000, gold. There is little danger of overproduction and consequent low prices for many years to come. So far as known, the areas where cacao prospers in the great equatorial zone are small, and the opening and development of suitable regions has altogether failed to keep pace with the demand.

Cacao is cultivated in a small way nearly everywhere in the Archipelago. It is grown in several provinces in Luzón, in Mindanao, Joló, Basilan, Panay, Negros, Cebú, Bohol, and Masbate, and its presence can be reasonably predicted upon all the larger islands anywhere under an elevation of 3,500 feet. In most cacao-producing countries its cultivation has long since passed the experimental stage, and the practices that govern the management of a well-ordered cacao plantation are as clearly defined as are those of an orange grove in Florida or a vineyard in California.

In widely scattered localities the close observer will find in the Philippines many young trees that in vigor, color, and general health leave nothing to be desired; and with due precaution and close oversight there is no reason why the growing of cacao may not become one of the most profitable horticultural enterprises that can engage the attention of planters in the Philippines. The cacao loves to "steam and swelter in its own atmosphere," and a bulletin has been issued by the Agricultural Bureau of the Philippines giving instructions as to how to select the locations best adapted to the growth of the plant, and the soil, drainage, and general attention required.

The cacao, relatively to the size of the tree, may be planted very closely, for it rejoices in a close, moisture-laden atmosphere, and thus permits a closer planting than would be admissible with any other orchard crop.

There are a number of varieties of cacao in general cultivation which may be referred to three general types—the Criollo, Forastero, and Calabacillo. The Criollo is undoubtedly the finest variety for general use. On breaking it is found to be whitish or yellowish white, while the seeds of those plants in which the Forastero or Calabacillo blood predominates are reddish, while the Forastero is almost violet in color. For flavor, freedom from bitterness, facility in curing, and high commercial value the Criollo is everywhere conceded to be the best. The others, however, yield better, are more vigorous, and not so liable to disease.

The bulletin describes the method of planting, cultivation, pruning, and harvesting the crop. Attention is also given to the enemies and diseases of the cacao, and among the former are mentioned monkeys, rats, and parrots. The estimated cost and revenues derived from a cacao plantation are given for a series of years, and the bulletin concludes with the statement that "the difference between good returns and enormous profits arising from cacao growing in the Philippines will be determined by the amount of knowledge, experience, and energy that the planter is capable of bringing to bear upon the cultivation in question."

The extraordinary demand that has sprung up within a few years for gum chicle has added another article to the long list that is being supplied by the Tropics. The consumption of chicle has become so great that the propriety of calling it a minor product may well be questioned. It is the foundation of all the fine chewing gums in the market, and practically all the gum raised is sent to the United States and used by the American Chicle Company which combines it with starch, sugar, and flavors, and in this form it finds its way around the world and to an ever-increasing number of victims to the harmless but unlovely gum-chewing habit.

The tree that produces gum chicle is *Achras sapota*, which also produces a fruit prized in many Philippine gardens, known as "chico." It is grown largely for its fruit, and the natives are generally ignorant of the far greater money value of its abundant milky sap or latex. The tapping of the tree, the collecting of its elastic sap, and the preparation of the gum involve none of the complicated processes required for the coagulation of rubber and are extremely simple. It is estimated that 3 or 4 pounds of gum can be withdrawn from a full-grown tree without injury, providing the tappings be conducted between January and July.

Multiplications by seeds or cuttings is tedious and, except in skilled hands, uncertain; but Filipino gardeners employ a system of marcottage that is worthy of a brief description. The process is to split in halves a single short joint of bamboo and then encircle a branch or limb of the tree with the two halves and then tie them together with rattan. This makes a cylinder around the stem, and the bamboo being cut at a joint is practically closed at the lower end. Before placing the tube, the leaves are stripped from that portion of the tree where it is to be tied and the bark of the branch slightly nicked with a knife.

The tube is then filled with fine, light soil. In a few months the tube will be full of roots and the branch, cut off below, is ready to set out and is a young tree of a size and vigor that could not be expected in less than two or three years from seed.

This undeveloped industry promises to become important in the Philippines, and as gum chicle is on the free list of the United States tariff it could be made to be a source of handsome profit to the grower.

Stock raising in the Philippines, like the same industry in Cuba, must

be built up anew, as a result of the ravages of war, to which in the former place must be added the loss occasioned by the rinderpest which carried off about 90 per cent of the cattle of the Islands. Prior to the outbreak of hostilities one writer stated that he saw herds of cattle and horses and droves of sheep, goats, and pigs everywhere. General Otis also in his report speaks of large herds of cattle and that some localities are distinctively cattle-raising districts. Fine grazing lands are to be found in eastern Pangasinán, northern Nueva Écija, Nueva Vizcaya, Isabela, and Cagayán, and probably in other provinces of Luzón; and certainly other islands. In the three provinces first named are rolling uplands, and in the latter broad, level prairie lands, although as far as abundance and quality of the grasses are concerned there is apparently no difference, the same species growing both on the prairies and hills. These grasses consist of one or two species of *Panicum* and *Eragrostis*, and many representatives of several genera of the *Andropogonæ*, all fine-stemmed, fine-leaved grasses, which, in the United States, would be popularly known as "bunch" grasses, as they grow in small tufts, not being truly turf-forming; yet there is sufficient of the latter to prevent gullying or washing, notwithstanding the heavy tropical rains to which the region is subject. Near the streams and in the river valleys, about rice paddies, etc., Bermuda grass is abundant, and near the coast Korean lawn grass is found everywhere.

The grazing lands in eastern Pangasinán, northern Nueva Écija, and throughout Nueva Vizcaya are characterized by their hilly, rolling character, the ravines and small valleys, tops of the higher hills, and surrounding mountains being densely forested. In every small valley one finds streams of clear, pure water, it being impossible to travel more than 3 or 4 miles in any direction without finding good water. Hence, it will be observed, that there is an abundance of feed, water, and shelter—the requisites for an ideal cattle country—and especially to be noted here are the topographical features of the country, which, in case of epidemics of rinderpest, are of especial value, as in these valleys whole herds of cattle can be isolated and, with a little care and watchfulness, guarded for months against infection by contact or through the water supply.

The water supply is especially to be noted, as in the numerous mountain streams the water is perfectly pure and as clear as crystal except immediately following a heavy rain. These streams during the rainy seasons, like the great rivers, are subject to great and sudden rise and fall, and from a quiet babbling brook one may change in a few minutes into a raging mountain torrent; yet where the mountains are heavily timbered the rise and fall are more gradual and do not go to extremes.

The grazing lands of Isabela and Cagayán differ from the above in being almost perfectly level, or but gently rolling, typical prairie lands extending almost as far as one can see in all directions, limited by the coast

range on the east and the great central range on the west, and extending from some distance south of Cordón north to the coast. The same species of grasses are found here as in the ranges of Nueva Écija and Nueva Vizcaya, and the quantity and quality are about the same. This great valley consists of open country with isolated trees, or sometimes small groves, with more or less forest land along the streams. The country is well watered by the numerous tributaries to the Cagayán River. In this valley the unbroken ranges are far more extensive than in the mountain regions, but, at the same time, in case of an epidemic of rinderpest, there is not the same opportunity of isolation as a means of protection against the disease.

Cattle raising for the home market should be a very profitable undertaking in northern Luzón, if one can judge by the prevailing high prices of meat in Manila, and the fact that practically all the meat consumed is shipped in on the hoof from Singapore, or as refrigerated meat from Australia and the United States. Certainly the conditions in Luzón are ideal for this industry, and the grazing lands of the island can not be surpassed by any in the world and certainly not equaled by 90 per cent of the grazing lands in the United States.

Hundreds of acres in these open ranges in some sections would produce a great abundance of native hay, and once the question of transportation is solved the Manila market could be cheaply and easily supplied with thousands of tons of it, as in many sections, under natural conditions, there would be a heavy yield of a fine quality of hay per acre, the natural lay and condition of the land being such that cutting and harvesting could be done by machine. At present thousands of tons of hay needed in these Islands for the support of native ponies, and especially for United States Army horses and mules, are imported from the United States and Australia.

Under the name of "zacate" are included several species of grass which produce the forage of the live stock, especially horses. The chief ones of these belong to the genus *Leersia*. The zacate fields are objects of much care on the part of the native farmers, especially if in the vicinity of large towns, as the returns are excellent, and the grass may be cut several times a year. The cogon grass (*Saccharum* species) reaches a height of 2 meters or more, forming a dense jungle almost impossible to traverse. The natives, with the object of obtaining fodder, are accustomed to set fire to these grass fields in the dry season and are thus enabled to obtain the young shoots, which are much relished by the cattle. In regions where the nipa does not grow, cogon is employed for thatching houses.

The native horses are small but very strong, resembling those of Java, and endure a great deal of hard treatment. No attention is paid to the breed or blood, and no doubt much could be done in this direction by importing from other lands such animals as seem best adapted

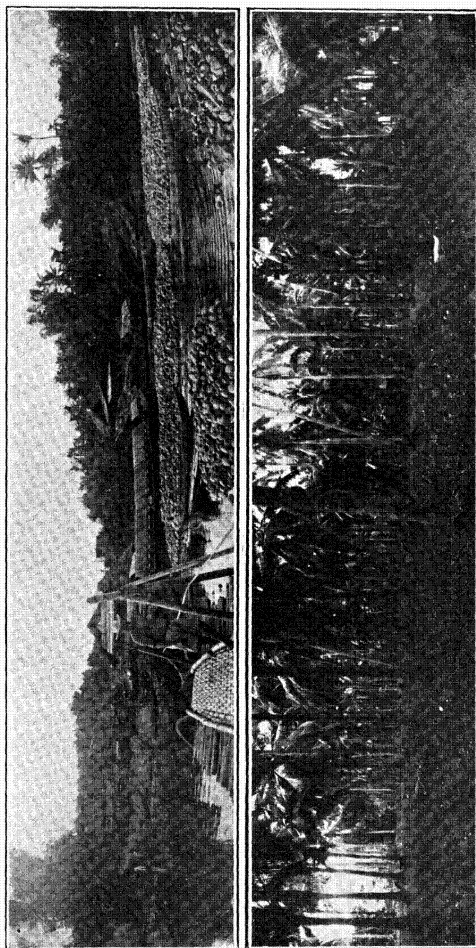
to thrive in the climate of the Philippines. The ever-present and indispensable carabao is also susceptible of improvement, and breeding animals have been imported by the Government for this purpose. Hogs are also raised, or rather allowed to propagate, in the same careless, slipshod manner that characterizes all other insular industries.

Among the other products of economic value in the Philippines are a number of essential oils, but the most important is that produced from the blossoms of the ilang-ilang tree. It is botanically known as *Cananga odorata* (Hook) and belongs to the custard-apple family. It grows both in a wild state and under cultivation, bearing leaves about  $2\frac{1}{2}$  inches wide by 6 inches long, and yellow blossoms, some 3 inches long and of extraordinary fragrance, from which is distilled the attar of ylang-ylang.

The attar of roses, the famed essential oil of the Damask rose of the Balkans, finds a competitor in this Philippine product, considered by some as its equal in perfume, gives a greater yield of essence, and is therefore a less expensive basic element for the perfumer. The ilang-ilang, while indigenous to many parts of tropical Asia, grows best in the Philippines, where it is a favorite with the natives. The tree is common to many localities south of Manila, being found chiefly in the well-populated islands and provinces, and it is said that it thrives best near human habitations. It is propagated in plantation by seeds or cuttings placed about 20 feet apart in each direction, and grows rapidly in almost any kind of soil. The flowers appear in the third year, and when the tree is 8 years old it will yield as high as 100 pounds of blossom. It blooms every month, but the best period is from July to December.

The process of converting the long yellow petals into essence is by the simplest form of distillation, no chemicals being required. The oil vaporizes in a closed boiler at a temperature of  $220^{\circ}$  F. The first quality must be clear as distilled water and of course fragrant, while the second grade is somewhat yellow and smoky. The oil is drawn from the bottom of a glass separator, filtered through talcum, and is then ready for market. About 75 pounds of flowers will yield 1 pound of oil. The flowers are worth from 8 to 15 cents, gold, per pound, and it costs about \$4 to manufacture. It is practically without competition in the markets of western nations and readily sells at from \$40 to \$55 per pound, the supply being unequal to the demand. The perfumers of Europe and, to a less degree, those of the United States make it the basis of some of their most expensive extracts. There are flowering groves in many parts of Southern Luzón and the Visayan Islands, and the tree abounds in the vicinity of Manila.

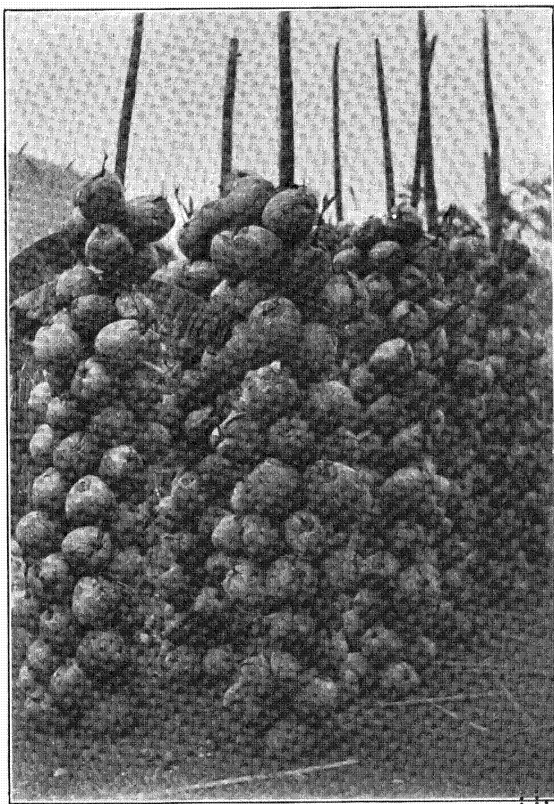
Among the oil-producing plants of the Archipelago the cocoanut easily holds the first place, as its various products satisfy so many industrial, economic, and medicinal wants. It belongs to the palm family and many varieties are found in the Philippines, especially in the Visayan Islands, where they have local names. An analysis of the meat in the



COCONUT RAFTS AND COCONUT PLANTATION IN LAGUNA PROVINCE.

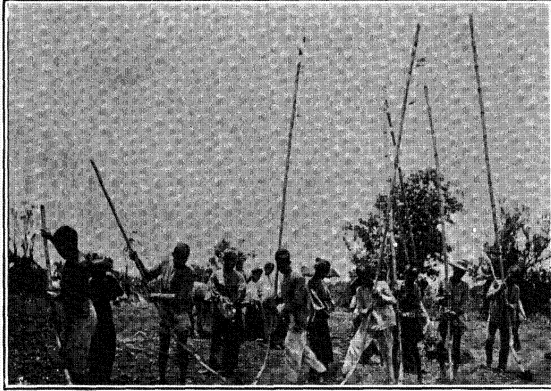


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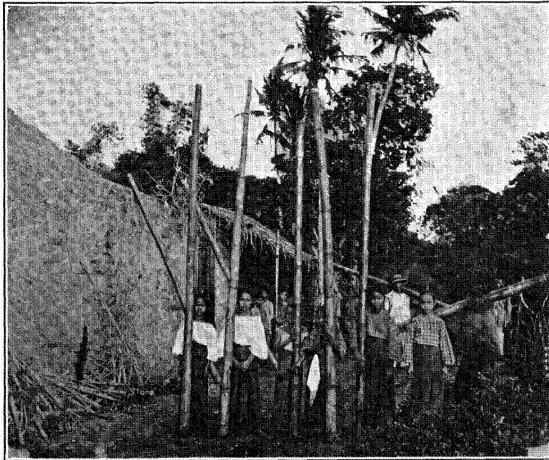


COCOANUT DEPOSIT IN ZAMBALES PROVINCE.



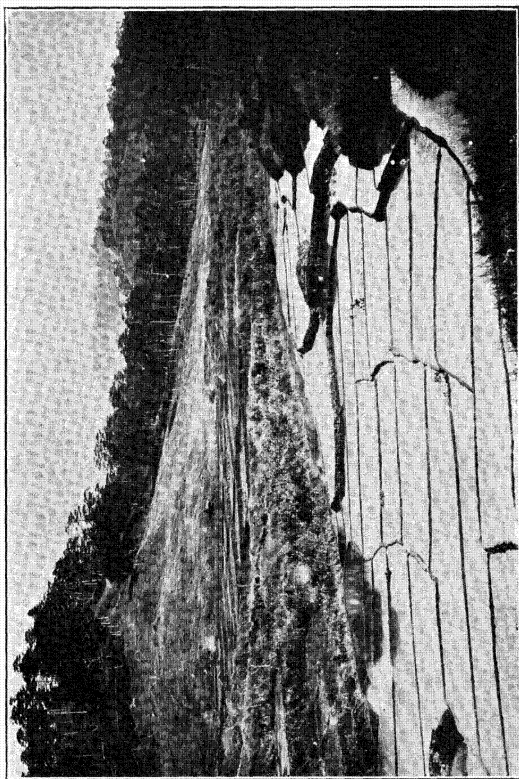


RICE PLANTERS IN THE CAMIANES ISLANDS.



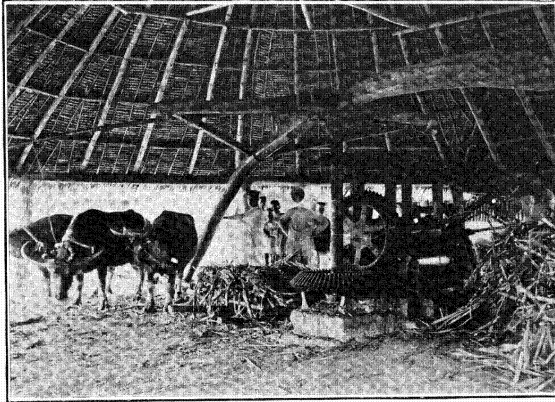
WATER CARRYING IN THE CUYO ISLANDS.





RICE FIELDS IN BENGUET.

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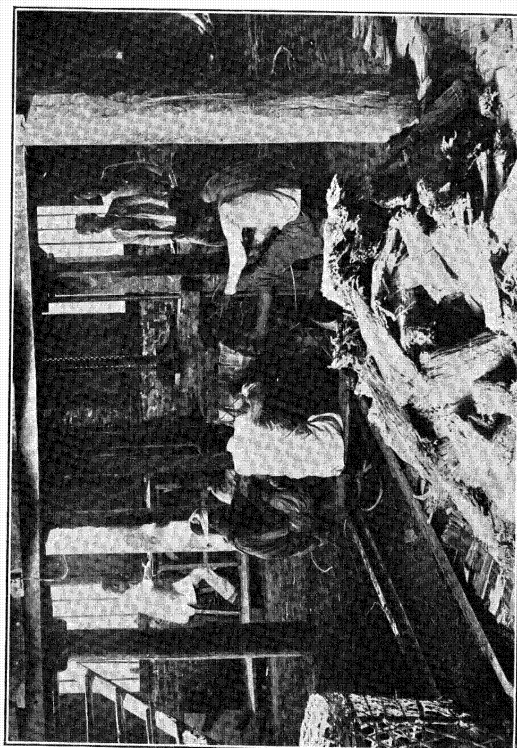
SUGAR MILL IN PAMPANGA PROVINCE.



CRUDE SUGAR FACTORY, PAMPANGA PROVINCE.

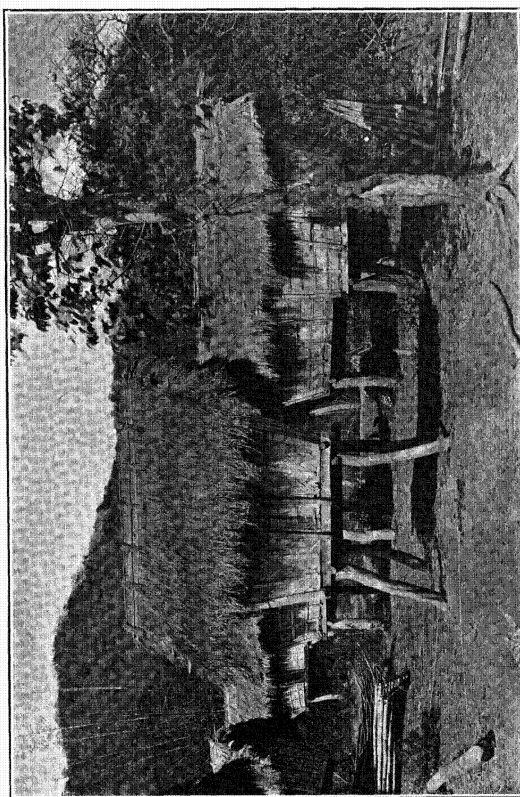


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TOBACCO PRESS IN SAN ANTONIO, ISABELA PROVINCE.

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RICE DEPOSITS, ABRA PROVINCE.

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cocoanut, according to Buchiver, is as follows: Water, 31.8 per cent; stearin and olein, 47 per cent; albumen, sulphate of calcium and sulphur, 4.3 per cent; potassium and other salts, 11 per cent; insoluble woody fiber, 8.6 per cent. The nuts are collected every four months, and transported, if possible, by water, when rafts are made of the nuts themselves, having simply a netting around them to keep them from separating, the owner riding on top.

Benne seed (*Sesamum indicum* L.) has been known in the Orient from the most remote times and is to-day cultivated in all tropical countries. The seeds of this plant contain as much as 53 per cent of fixed oil, which is somewhat similar to olive oil and is often mixed with the latter to adulterate it. It has a sweet taste, although more insipid than olive oil, and becomes rancid very slowly. In Egypt, Japan, and other countries it is used in cooking in place of lard or olive oil. It is excellent for making soap, and is also employed as a cosmetic and in the preparation of medicinal emulsions. The residue left after the extraction of the oil is used as a fertilizer and is also an excellent food for fattening cattle. Of that cultivated in the Archipelago but a small quantity is exported.

Lumbang (*Aleurites triloba* Bl.) is cultivated for the oil which is extracted from its seeds. This oil is of good quality, is used for illuminating purposes and for calking ships, and is an excellent substitute for linseed oil in the preparation of pigments. It is exported to China. The castor oil bean (*Ricinus communis* L.) is grown in the Philippines, and its seeds produce about 40 per cent of their weight in oil, which is used as medicine. A reddish oil, very useful for illuminating, is also extracted from the seeds of a tree (*Jatropha curcas*) and which bears different names in different parts of the Archipelago.

The peanut is a native of lower Guinea, from whence it was carried to Brazil and is now cultivated in all America, the southern part of Europe, Asia, and Oceania. In the Philippines it is cultivated on a small scale, but chiefly as forage for cattle. If the cultivation, however, is carefully conducted, the seed will yield half its weight in an oil which the natives often mix with cacao in the manufacture of chocolate.

The nutmeg grows without cultivation in Cebú and in the Province of Laguna, and under culture will flourish in all parts of the Islands. In the Dutch East Indies, where the cultivation of the nutmeg has received the greatest attention, the plant or tree attains to a height of 40 feet. The trunk is covered with a thin, dark bark, slightly mottled in appearance, and when cut exudes a red juice which coagulates on coming in contact with the air. The fruit in size resembles a small peach, having a thick husk and a hard pit about the size of an almond within which the nutmeg is formed. This is enveloped in an aromatic skin or membrane known to commerce as mace. From the beautiful flowers of the

tree, which are aromatic, the natives make a preserve noted for its fragrance.

The cinnamon tree is also native to the Philippines, being found in abundance in Mindanao. In Zamboanga, Caraga, and in the mountain districts of Misamis varieties of cinnamon of stronger taste and fragrance than that of Ceylon are found, although it contains a bitter element which depreciates its value, but this might be eliminated by cultivation. The cinnamon of commerce is the outer bark which has been stripped from the young branches. Pepper also is produced in many parts of the Archipelago, but little is exported, as sufficient attention has not been paid to it to enable the Philippine product to compete with that raised in other parts of the East Indies.

Among the dye-producing plants, indigo, a native of India, holds an important place. The juice extracted from its leaves and young stalks furnishes the well-known dye so much used in the industries. Indigo is produced in Bataán, Batangas, Bulacán, Laguna, Pangasinán, Pampanga, Zambales, and Ilocos Norte and Sur. The plant has small, slender, round leaves whose tips are colored, and produces little, slender pods full of seeds. Although the plant grows in temperate climates, two or three crops a year may be obtained in warm, moist regions as against one in temperate zones. The most suitable ground for the cultivation of the indigo is that having light, deep soil, as the roots of the plant ramify but little, the central long root penetrating deeply into the soil. The land should be free from trees, so that the sun's rays are not obstructed, for under such conditions the juice of the leaves and young stems is more abundant. As the coloring matter is extracted principally from the leaves, these should be collected as soon as they are completely formed and before the fruit appears. The indigo in the leaves is without color and in solution. When the juice is extracted from the plant it is yellowish in color, but on being exposed to the air it changes successively to yellowish green, green, greenish blue, and finally becoming insoluble, it falls as a blue precipitate to the bottom of the vessel, about thirty hours after the extraction of the juice.

The sappan also furnishes from its woody trunk a coloring matter similar to campeachy or logwood, which is employed in dyeing cotton or wool. It is very abundant in the forests of the Philippines, and some excellent varieties are found which produce a color more highly valued than that of the Brazil woods. It is an important article of export to China and England, the former country using it in dyeing silks, damask, and other fabrics woven in China.

The safflower, or alazar, is a plant of the family *Compositæ*, called also bastard saffron, and in the Philippines "biri." It is valued and cultivated for its stamens, which contain three principal coloring matters—two yellow, soluble in water, and of little value, and the third red, soluble

in alkalies and of greater importance. It is used in the adulteration of saffron.

The natives extract dyes from various other species of wood. From the bark of the tree called "bagalibas" a dye is obtained which will give cloth a fine tawny color. The prepared bark of the tree called "dayagao" makes a fine mordant, which imparts a luster and great stability to cloth dyed black, yellow, or red. Belolo, dugna, and hatur are much used by fishermen for dyeing and strengthening their nets, which take on a dark-brown color and are rendered less susceptible to rotting.

Leguminous plants are of but little importance in the Philippines. One exception is the commonly cultivated mongo (*Phaseolus mungo* Linn.), smaller than the lentil but of the same flavor, which is cultivated on a large scale, it being the principal food of many towns. The butingui is the true kidney bean and is found in considerable variety in Philippine gardens. The zabache is also highly prized, and the sitao produces a vegetable about a foot long. The patani and the frijol from Abra are also appreciated and cultivated.

Although the origin of the sweet potato (*Ipomœa bataas* L.) has been much discussed, it is believed to have come from Mexico, and this tuber is greatly favored by the mountain races of the Islands, which seems to indicate the antiquity of its introduction. The plant grows in five or six months, extending its shoots in all directions, completely covering the soil with its abundant leaves, which are also edible. Where the ground is given over to the exclusive cultivation of this plant, it is allowed to take root in all directions, and as the roots extend and grow the tubers continually, they may be dug up for use at any time. The potato (*Solanum tuberosum* L.) has not done well in the Philippines and is only cultivated with success in certain elevated localities such as Benguet.

The cassava is a native of tropical countries, whose roots contain an abundance of starchy fecula known as tapioca, whose good qualities are well known. In the Antilles, where it is known as yucca, it is cultivated with great care. The yucca or camoting cahoy, as it is called in the Philippines, grows well in both temperate and hot regions.

The plant is multiplied by means of buds growing from the knots on the woody trunk. The roots attain a considerable size, and while they are still fresh they contain a milky juice which is poisonous, but this disappears upon boiling or upon exposure to the air for twenty-four hours, leaving the residue of the milky juice quite inoffensive.

In order to utilize the root as food it is necessary to grate it, wash it, and subject it to a considerable pressure to express the juice, and the material remaining after these operations is the flour or tapioca.

Arrowroot, known in the Philippines as tagbac-tagbac, is also a producer of starchy fecula, sometimes called sago. It is an herbaceous plant growing about 1 meter in height, having lanceolate leaves about 15 centimeters in length, similar to those of the banana plant. The part of the



stalk underground gradually diminishes in size, to the point of insertion, into a long, horizontal, fleshy, white tuber which contains a considerable quantity of fecula.

The buri (*Corypha umbraculifera* L.) is celebrated all over the Archipelago, giving name to the Island of Burias, where it is abundant. It belongs to the palm family, growing to a considerable height, is very beautiful, the trunk being adorned with an extended bunch of leaves that are green in color, though the young ones are white. It grows spontaneously in all parts, the natives never planting or cultivating. The leaves are very large and extend from a single base in the form of a fan. It does not produce fruit until many years old and, like the century plant, after fruiting shrivels and dies. The fruit grows in bunches from the top of the tree, but is not edible. To obtain the starch, the tree is cut down at the root, and all the soft interior part of the trunk is taken out and placed while moist in casks or troughs, while some of the bitter substances are drained from it. It is then pounded with mallets, and the starch separates in the form of very fine grains. This is dried and made into flour, which serves as food, and may be purchased in the markets of the larger towns and is known to commerce as sago.

There is also a palm (*Metroxylon rumphii* Mart.), locally called bag-sang, which is common in the Visayan Islands, growing along the banks of rivers and in other moist regions, which provides food when there is a scarcity of rice. To utilize this product the tree is cut down and stripped of its bark, which is called boje, and which has many uses. The heart of the tree is then cut into strips, which are dried over a fire and saved for future use. When needed, it is pounded in wooden mortars to a sort of a flour and made into cakes or fritters, which when eaten with cocoanut milk are both toothsome and healthful.

Among the fiber-producing plants, mention has already been made of the hemp, which furnishes the largest single item of export and affords employment to thousands of agricultural laborers.

Cotton is cultivated in the Provinces of Ilocos Sur and Ilocos Norte, Unión, Pangasinán, and Abra. The species cultivated are *Gossypium herbaceum*, G., *perenne*, and *Ceiba pentandra*. They are, respectively, herbs, bushes, and trees. The first is the only one which is really cultivated and whose product is used in the manufacture of cloth. The others are found growing wild, their cotton being used only for making pillows and mattresses.

The pineapple, which is cultivated for its delicious fruit, also furnishes a fiber which is obtained from the leaf. The pineapple has about the same geographical distribution as coffee. It requires an even temperature and will grow on almost any sort of soil. In the West Indies it is cultivated for the fruit, but in the Philippines it is more valuable as a textile plant. The leaves are cut off when they attain full size and then scraped with a sharp instrument in order to separate the fleshy

part from the fiber. The latter is then washed, dried in the sun, and combed out. It is classified into four grades according to its fineness, and is employed in the manufacture of fabrics. The finer filaments are woven in very rough looms into a most delicate cloth, called piña, which commands a high price and is highly prized in the Philippines.

Ramie probably had its origin in Java, Sumatra, or the southern part of China. It is a nettle, but without needles, and is cultivated for its fiber, which, like flax, is formed on the outer part or bark of the plant. In spite of the excellent quality of this fiber, cultivation has not increased on account of the difficulty of extraction, which can only be done at a profit with special machinery. In the Philippines it is found in the Batanes Islands and in the northern part of Luzón.

The agave, or century plant, whose original home was America, is cultivated on a small scale in certain localities in the Philippines. Its fleshy, sharp leaves, bordered with a row of spines, furnish a long strong fiber from which a delicate cloth is woven.

Rattan of the genus *Calamus* is represented by several species called by the natives dilan, yantoc, talola, curag, and palasan. These spiny, climbing plants, which sometimes attain a length of 600 feet, furnish the natives with a useful material of most extended application. All the framework of the houses built of bamboo and nipa, and many of those built of wood, are held together by strongly laced bands of this material. These rattans, called bejuco, are also employed in the rigging of all the smaller boats, and in the making of rafts, etc. In some of the provinces hats and sacks are made from the rattan, and in other places chairs and other articles of furniture. With plenty of bamboo, rattan, and a bolo, a native can fence his farm and build and furnish his house.

There are few plants in the Islands more important than the bamboo. There are a number of species, but the most useful is the Cauayang totoo, which at times reaches a diameter of more than 20 centimeters and a height of more than 12 meters. It is employed chiefly in the construction of native houses, which are often made wholly of bamboo, with the exception of the rattan used to tie it together and the cogon or nipa used as thatch. The posts, floor, rafters, and doors are all of bamboo, which the natives employ with great skill. Either entire or split into strips, it is used in the construction of boats, rafts, bridges, aqueducts, scaffolding of all kinds, baskets, furniture, fishing apparatus, arms, rope, etc. This plant, together with the cocoanut tree, the nipa palm, and the rattan are truly providential for these countries.

Although the natives do not care much for the cultivation of garden plants, they are found near the large centers of population, being generally cultivated by Chinese and the products sold to Europeans. Among those cultivated are onions, garlic, asparagus, radishes, cabbages, artichokes, endives, peppers, tomatoes, carrots, celery, parsley, and the haras (*Foeniculum vulgare*), a native plant whose fruit contains seeds having a sweet flavor similar to anise. Of the family of *Curcubitacæ* there

are also a large number of plants, among which are the common squash, of which there are several varieties. The genus *Cucumis* is represented by four species, one of which, called the *Tobacog* (*Cucumis melo*), is a true melon, but, while possessing a delightful aroma, never reaches the excellent flavor of the American melon. Cucumbers are also raised, and in Laguna the strawberry occurs.

The Bureau of Agriculture has been active in the work of distributing field and garden seeds, and during the season of 1902 nearly 20,000 packages, including 134 varieties, have been distributed to the farmers and gardeners of the Archipelago, with simple yet explicit directions as to planting and cultivating. Steps are being taken also to introduce from the United States and other countries small orchard fruits, and in the more elevated regions efforts will be made to grow the fruits of the temperate zone.

The recent discovery on the Island of Negros of a native species of grape suggests the possibility of a line of fruit growing which has never been attempted. This wild grape, with great resistance to humidity and heat, possessing great productiveness and robust habits, may prove of inestimable value for the ultimate development of a race of grapes, adapted to the Islands and suitable either for the table or for the manufacture of wine.

Little attention has been given to the cultivation of fruit in the Philippines, but both the wild and cultivated varieties are abundant and will, under intelligent direction, be very much improved. One of the most highly prized fruits is the mango, which grows well in Luzón and in the Visayas. The fruit has a delicate flavor and an aromatic odor, the largest of them being fully 6 inches in length. In shape they are somewhat oval and flattened; the skin is smooth and yellow, and the pit, which lies in the center of the fruit, is almost as long as the fruit itself, but very thin. The leaves are long and wide, and an infusion of these is something like tea. There are a number of varieties of this delicious fruit. The other fruits worthy of mention are the following:

*Anona reticulata* (L.), the anona, an exotic from Mexico, its flesh being white, sweet, and fragrant.

*A. squamosa* (L.), called ates, a juicy aromatic, sweet fruit, that seems to melt in the mouth. It is of American origin.

*Diospyros discolor* (Willd), called mabolo, whose reddish fruit is of a strong odor and about the size of a quince, and whose wood is capable of taking a magnificent polish.

*Garcinia mangostana* (L.). This is an exotic, and grows only in the southern part of the Archipelago and is called the "King's fruit," because so highly prized by the Moro sultans.

There are quite a number of other fruits aside from oranges, lemons, limes, bananas, guayabos, sapotes, for which no English names have been found, and the native names afford but little information concerning them.

## Chapter VIII.

### MANILA HEMP.

Demand for Manila hemp—Qualities of the fiber—Distribution of the plant—Conditions necessary to growth—Lack of cultivation—Exposed to but few accidents—Districts where grown—Soil best adapted to hemp growing—Methods of planting—Cultivation—Extraction of fiber—How marketed—Machines for extracting the fiber—Export duty on hemp—Table of exports.

The most important industry in the Philippines is the growing of Manila hemp, and it is a business that fears no rival, for no other part of the world has ever succeeded in producing this valuable fiber in commercial quantities. The demand for Manila hemp is also constantly on the increase, for aside from the amount that is consumed from year to year in the manufacture of cordage, the American self-binder that is harvesting grain in the Northwest, on the plains of Canada, on the pampas of the Argentine Republic, and in the great new wheat country opened up by the Siberian Railway, is constantly calling for twine, and none is so good as that manufactured from the fiber of the *Musa textilis* or Philippine hemp plant. The qualities that make it particularly valuable for these purposes are its strength, pliability, and ability to resist the deteriorating influences of the weather. It retains its strength a long time after being exposed to sun and rain, while most other fibers, used as substitutes, will scarcely hold the sheaf together long enough to reach the thresher. The fiber of the sisil hemp, of Yucatan, and of the yxtle from the plateaus of Mexico is strong, resists the weather well, but is harsh and wanting in the pliability that is characteristic of Manila hemp.

This fiber is the product of a wild species of the plantain or banana plant, very similar in appearance to those which bear edible fruit, and is found quite generally distributed throughout the Archipelago, being produced in Luzón, Leyte, Sámar, Cebú, Mindoro, Marinduque, Negros, Panay, and Mindanao. The Province of Albay, in the Island of Luzón, is especially dedicated to this industry. The plant, though requiring a considerable amount of moisture, will not thrive on swampy land, its favorite habitat being well-watered slopes where the drainage is good, and, like the coffee, should be protected from the direct rays of the sun while growing. Richness of soil does not seem to be essential to its proper development, as it is sometimes found growing on the slopes of volcanic formations, that have not yet been sufficiently disintegrated to

make good deep soil. The slope of the beautiful Mayón Volcano is the very center of the hemp-producing district of Albay.

The value of the plant lies in its leaves, the petioles or leaf stalks which contain the long, white, strong fibers for which it is so widely cultivated. There are many varieties of the plant, in some places as many as fourteen being recognized, which differ as to variations in the color, shape, the number of shoots that spring from the roots, as well as the strength and development of the fiber. In Albay experts distinguish varieties by the size of the stalk, the shape and size of the leaf, and especially by the strength of the fiber. No systematic and enlightened effort has ever been made to develop by cultivation the desirable qualities of the plant, as has been done with oranges, coffee, and many other valuable growths. However, under the intelligent direction of the present Bureau of Agriculture, there is no doubt that this subject will receive attention and a plant will be developed which will possess a maximum of desirable qualities and an increase of fibers.

It is a fact worthy of note that hemp has not been cultivated in other countries where similar climatic conditions obtain. It is thought by those who have given some attention to the subject that the failure to transport the industry to other countries eager to share in the gains derived from this rich product, is owing, not so much to the nonadaptability of the plant—for it has been grown successfully in the botanical garden at Saigon in Cochin-China, and also in British India—as to the fact that the successful treatment of the fiber is peculiar to the natives of the Philippines, an art acquired through long years of practice.

There are few crops less exposed to accident than hemp. Dry weather might parch the growing plants, but with the rainy season as regular as the tides, this risk is small indeed. The dense protecting forest growth shields the plant from hurricanes, while the highlands on which it grows are safe from inundation. Fire can make no headway among the great green leaves and moist stems. Locusts, which sometimes devastate other Philippine crops, will not touch the plant, and beetles and other insects harm it but little.

The importance of this industry in the Philippines and the world-wide demand for the product justifies a somewhat detailed description of the more important districts where the fiber is grown and made ready for market. In the Province of Camarines Sur there are several important hemp regions, the products of which are shipped from the capital, Nueva Caceres, situated near the center of the province on the Bicol River. The Mount Iriga district, which exports annually from 3,000,000 to 3,500,000 kilos, has been studied with some care, but there are other important districts situated in the eastern part of the province in the vicinity of Lagonoy and in the western part near Pamplona.

Mount Iriga, around the lower slopes of which the "abacá lates," or hemp farms, are situated, is an old volcano and lies about midway between the volcanoes Isarog and Mayón. Of less elevation than the others, it rises some 1,220 meters above the level of the sea. It is on the north side of the mountain that the extensive hemp plantations are found, for the southern slopes have a strong, shallow soil unsuited to the growing of hemp. Apparently during the last eruption the winds blew from the south and all the finer ashes and detritus were collected on the north side, much as snowdrifts collect on the lee side of a fence, and it is from these that the soil is derived. The soil is rich in decayed organic matter, and even where hemp has been grown for forty years there is apparently no diminution of the original fertility. Protected from washings of heavy rains by the thick growth of hemp and by the always rotting mass of dead leaves and trunks of the plant from which the fiber has been extracted, the soil is kept in a state of almost virgin fertility, for everything is returned to the soil except the extracted fiber.

The soil possesses excellent drainage, and the hardest rains readily percolate through on account of its loose, mellow nature. The color varies from a purplish red, the color of the rocks from which it is derived, to yellowish brown and jet black. On the lower slopes the purplish red predominates, while on the upper heights the color becomes darker.

Abacá has been grown in this district for more than forty years, and present prices having stimulated the development of the industry, new lands higher up on the mountain side have been cleared and planted. The hemp produced in this district is shipped in large, loose bales on "barrotes"—long narrow boats—on the Bicol River. Two of these barrotes are lashed together by means of bamboo poles and bejuco or rattan and will carry a considerable load of loosely bound abacá to Nueva Cáceres. There it is assorted into the various grades by skilled workmen in large warehouses and rebaled into bundles of 125 kilos each. From this city it is shipped in light-draft steamers to Manila, and from there to all parts of the world.

At present, as has been stated, Albay is the greatest hemp-producing province in the Archipelago. While the market price of the hemp from this district does not equal the price produced in Sorsogón or Leyte, still it is sufficiently high to render its cultivation practically the only industry of the province, and other crops and occupations have been abandoned for this more profitable fiber. The province is fortunate in possessing two good ports—Legaspi and Tabaco—and from these points large shipments are of almost daily occurrence. During the year 1900 the Province of Albay shipped 30,382,812 kilos of hemp—more than one-fourth of the amount shipped from the entire Archipelago. Large quantities are gathered in the region adjoining Tabaco, while the towns of

Palangui, Oás, Ligao, Guinobatan, and Camalig, in the central part of the province, furnish considerable for shipment.

No mention of the soils of this province should be made without some reference to the majestic Mayón Volcano, from whose ashes and dust nearly all of the soils of the province are derived. Situated near the seashore, it towers 2,415 meters above the surrounding country and is a noted landmark to those navigating the adjacent waters of this part of the Archipelago. Numerous instances of damage wrought by its eruptions are recorded by Spanish observers, and even since the American occupation one slight eruption has occurred, though no serious damage followed.

Inasmuch as the soils of this province are derived from the same source, it is to be expected that they should be all quite similar, and not unlike those of the Mount Iriga district, already described. Volcanic soils are nearly always exceedingly fertile, and those of this province are no exception to the rule. Very little heavy clay is found, but all variations from light sandy loams to heavy sandy loams are encountered. The sand in the soil is sharp and feels like bits of broken glass. In a region of heavy showers at frequent intervals, followed by hot suns, such a soil maintains just the proper heat and humidity, not only for the growing abacá, but for many other valuable crops as well. The underlying gravel beds insure a perfect drainage, while the loamy nature of the surface catches and retains the abundant rainfall. The rapid decomposition, under tropical conditions of a moist, warm atmosphere, of the small particles of sand and gravel, constantly sets free an abundant supply of fresh plant food, so that the fertility of these soils is easily accounted for and will continue for a long while.

The hemp districts of other parts of the Archipelago are not unlike the two described, which may be taken as a fair sample of the whole. In many parts of the Archipelago, especially in southern Luzón, new sites for the cultivation of hemp are selected on the slopes where the wild plant is found growing. Almost without exception the abacá selects for its habitat the slopes of mountains and hills where natural conditions are conducive to a moist and cool atmosphere. In preparing the land the greater part of the original forest growth is removed, a fair proportion of the trees, however, being left for shade and protection from windstorms.

Holes are dug at intervals of a few feet, and the suckers or offshoots of old plants are set out. It is customary to plant sweet potatoes at the same time to prevent the land from washing and also to afford shade to the tender sprouts. Sometimes rice and even cane are planted for the same purposes. Three years are usually required for the plant to arrive at maturity, and then the field can be cut over every few

months, the usual custom being to cut the ripe plant twice a year. Only the larger stalks are taken from each plant, and in this way but little injury is done to the remaining growths.

But little cultivation is necessary except to destroy with the bolo the dense growth of grass and weeds that spring up every few weeks. The trees that are left standing in the abacá fields are called "good" or "bad"; those being considered "good" which will allow a plant to maintain a vigorous growth to within a short distance of its trunk, and those "bad" on which the abacá does not thrive within a radius of several feet of the trunk. In many localities the dapdap (a species of *Tryhrina*), as it is called in the Bicol language, is considered an excellent tree. Usually a tree is considered good when it has small leaves that soon decay on the ground and do not form a mulch thick enough to injure the growth of the plant. Any leguminous tree would be classed as good, for it would not only help to enrich the soil by adding some store of nitrogen, but would serve as a shelter from the heat of the sun and afford protection from the heavy winds.

Before the plants are sufficiently ripe for cutting and extracting the fiber, the fields are cleared of all weeds and grass. The stalk of the ripe plant is cut close to the ground with a bolo and the outer leaves or petioles stripped off. The trunk of the plant consists of leaf stalks which overlap each other closely. These are pulled off one at a time, and from them the laborer removes the outer portion of the sheath which contains the valuable fiber. To remove this outer sheath from the fleshy part of the stalk a small knife is used to split the stalk at the base, and then it readily parts along its entire length, and the fleshy part is thrown away. As the outer sheath containing the fiber is removed it is carefully straightened out until the entire plant has been treated. After a number of plants have been subjected to this process, the pile is ready to have the fiber removed. This should be done at once or the strong juices of the plant will discolor the fiber, though extraction is easier after the petioles have been allowed to wither.

The fiber is removed by drawing these outer sections of the sheath under a knife. Plantation owners make every effort to induce the natives to use knives without teeth in order that the fiber may be clean, fine, and white. There is, however, a strong tendency on the part of the operator to use a toothed knife. Indeed, the last report on this industry states that the serrated knife is employed, but that the finest quality of fiber is obtained by pressing a toothless blade on a block of wood and drawing the petioles between the two in order to separate the pulp and juice from the fiber. The machine for extracting the fiber is a crude affair, and can be transported from one part of the field to another as occasion demands. The knife is set in a wooden handle and so arranged that it may be raised or lowered by means of a lever arrangement operated by the foot,



and considerable pressure is brought to bear on the petiole while passing under the knife.

It has been estimated that from 20 to 30 per cent of the fiber is lost in the process of extraction. From this refuse a fair quality of paper may be manufactured. By drawing the cleansed fiber through the knife a second time a much finer and whiter quality of hemp can be obtained, but the per cent of loss is correspondingly greater. The average laborer working sixteen hours per week, for it is useless to expect him to work every day, will extract from 20 to 40 kilos of fiber, 30 kilos being considered a fair average for a week's work. After the fiber has been drawn through the knife it is hung on bamboo poles or strings to dry. The work of harvesting is carried on throughout the entire year, though the work of drying is necessarily hindered during the rainy season. At the close of each week the operator collects the dried hemp into a loose bundle and transports it to the large buyer.

In the larger cities in each district there are usually warehouses that purchase and repack hemp for shipment to Manila. In these experienced men sort the fiber into three or four grades and pack it into bales of uniform weight and size. Three grades are recognized and the fiber baled accordingly and marked with some letter or symbol. In addition to these grades there is occasionally a fourth or superior grade recognized, composed of only the very whitest and finest hemp. But little of this quality is secured in the large amounts that reach the warehouses. Aside from these grades the natives by careful selection of the plants and attention to extracting the fiber produce a certain quantity of very fine quality which, mixed with other material, finds ready sale for weaving into the different kinds of cloth so highly prized by the natives.

While the number of stations recording the rainfall and temperature conditions of the principal abacá districts is small, still there are some features brought out by these records that deserve mention. The climate for the greater part of the abacá districts is not characterized by a pronounced wet and dry season, as is western Luzón, Panay, and Negros. In these districts the distinction is decidedly marked, for from three to ten times as much rain falls during the wet season as during the dry. On the other hand, in the regions producing the greater part of the abacá exported the rainfall of one period of the year nearly equals that of the other. In Albay the remark is frequently made that the rainy season lasts the entire year. The rainfall exceeds 118 inches, and it is rare for a week to pass without a heavy shower.

The cultivating of the soil to conserve the moisture and the planting of leguminous crops to increase the supply of nitrogen in the soil are matters that at present are altogether untried. No doubt much can be done by proper cultivation, the selection of those varieties of plants that

are known to yield a fiber of superior color, strength, and length, the pruning of necessary suckers so as to allow only the best plants to come to maturity, more careful judgment as to the best time to cut the plant, and greater study as to the ability of the soil to mature more plants that need careful study in the further development of the industry.

The question of extracting the fiber is an important one, and has received considerable attention for many years. Quite a number of machines have been invented that apparently solved the problem, but after trial they have all been abandoned and the old primitive methods are the only ones employed at present. These methods, however, are so crude, so slow, and involve such a percentage of loss that it will indeed be strange that when American brain, brawn, and capital become interested in the subject some better way will not be discovered. A people that invented the cotton gin and the numberless other appliances for planting, cultivating, harvesting, and marketing crops, will not allow themselves to be defeated by the difficulties presented by the petioles of the abacá. A successful machine that will extract in good condition a larger percentage of the fiber and at the same time be economical in operation would more than double the value of all the land in the Philippines adapted to hemp growing.

The act of March 8, 1902, entitled "An act temporarily to provide revenue for the Philippine Islands, and for other purposes," provides that:

All articles, the growth and product of the Philippine Islands admitted into the ports of the United States free of duty under the provisions of this act and coming directly from said Islands to the United States for use and consumption therein, shall be hereafter exempt from any export duties imposed in the Philippine Islands.

As there is an export duty of 75 cents per 100 kilos (about \$7.50 per ton) on hemp exported from the Philippines, the above provision, in effect, waives that duty on hemp coming directly to the United States, and accounts for the rapid increase of importations since its enactment.

The table, herewith, gives the exports of hemp from the Islands from the date of American occupation to the close of the calendar year 1902. It will be noted that the table simply gives the totals in tons and values.

## Table of hemp exports from 1850 to 1902.

[From the report of the Manila Chamber of Commerce.]

Year.	United States.	Great Britain.	California.	Australia.	Other ports.	Total.
	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>	<i>Bales.</i>
1850.....	59,097	8,740			2,578	70,415
1851.....	71,567	11,801			3,918	87,286
1852.....	110,257	11,876			3,499	125,632
1853.....	102,292	6,545			2,508	111,345
1854.....	114,009	46,369			948	161,326
1855.....	107,290	10,335			1,867	119,492
1856.....	156,193	18,604	1,449		1,401	177,647
1857.....	121,555	47,991	2,678		1,571	173,795
1858.....	144,476	52,817	5,070		3,889	206,252
1859.....	142,328	65,336	2,440		2,985	213,089
1860.....	140,738	51,019	4,720		2,019	198,496
1861.....	80,489	96,831	4,800	8	1,882	184,010
1862.....	114,697	113,743	5,300	670	1,645	236,055
1863.....	110,902	91,830	6,260	477	2,567	212,036
1864.....	124,553	113,129	4,713	2,597	1,684	246,676
1865.....	144,722	39,658	6,800	4,775	2,943	198,898
1866.....	138,444	48,216	7,560	6,122	2,010	203,352
1867.....	143,785	57,015	8,801	6,050	2,251	217,902
1868.....	147,364	65,030	7,100	10,572	2,474	232,540
1869.....	146,846	87,284	11,000	6,729	1,315	213,174
1870.....	163,859	65,590	7,950	5,717	1,164	244,280
1871.....	242,556	71,749	11,250	3,358	2,963	231,876
1872.....	200,172	88,535	17,124	4,064	2,725	312,620
1873.....	161,057	119,482	17,998	9,600	3,197	311,334
1874.....	158,965	114,197	24,638	4,995	4,512	308,007
1875.....	99,216	131,987	19,111	7,598	5,004	262,916
1876.....	120,327	153,095	21,750	14,262	5,730	315,364
1877.....	153,222	142,317	9,700	6,597	3,432	315,268
1878.....	124,592	172,174	17,650	15,856	3,417	333,689
1879.....	162,264	136,229	14,500	6,050	4,936	323,979
1880.....	189,657	178,143	14,910	12,190	5,563	400,463
1881.....	253,361	148,763	19,500	9,546	3,282	434,452
1882.....	176,521	142,519	14,300	16,752	3,580	353,672
1883.....	176,670	167,151	9,400	16,866	3,348	373,435
1884.....	168,074	213,577	7,431	13,070	5,657	407,809
1885.....	194,309	190,199	8,067	13,372	10,463	417,130
1886.....	173,061	164,148	13,150	9,737	11,586	371,682
1887.....	245,845	227,288	15,528	14,798	11,514	514,973
1888.....	246,437	347,854	34,950	17,723	14,465	661,429
1889.....	199,707	322,022	20,200	17,561	9,081	568,571
1890.....	109,719	341,993	21,500	18,413	14,530	506,155
1891.....	132,267	443,213	24,350	18,522	17,194	635,546
1892.....	383,076	358,366	19,756	13,783	15,527	790,508
1893.....	212,463	372,841	22,050	15,393	18,722	641,469
1894.....	401,755	335,372	18,600	10,779	29,475	795,981
1895.....	273,918	493,760	27,750	13,085	23,782	832,295
1896.....	290,327	407,522	18,450	16,888	32,706	765,893
1897.....	417,963	403,522	25,450	18,829	36,614	902,378
1898.....	338,124	392,127	18,325	15,893	28,137	792,606
1899.....	265,828	269,860	19,120	14,576	31,354	600,738
1900.....	151,590	448,264	34,055	18,883	35,600	688,392
1901.....	186,707	653,822	24,802	15,784	32,234	913,349
1902.....	399,099	380,161	34,436	9,927	22,897	846,520

## Chapter IX.

### LAND TITLES.

[Revised by Judge D. R. Williams.]

Spanish grants—How title was acquired—"Composición"—Perfecting title to land—Lack of definite system of survey—Land Registration Act—Court of Registration—Register of deeds—Application for registration of titles—Incumbrances—Fees and penalties—Public lands, how acquired—Act of July 1, 1902—Size of homesteads.

Immediately after the acquisition by Spain of her extensive ultramarine possessions her monarchs set about the task of peopling those distant regions with their subjects. To accomplish the objects they had in view one of the first steps taken was to make gratuitous concessions of lands not only to those who had assisted in their discovery and conquest but also to such persons as were willing to quit their native land and become colonists in the newly discovered world.

Consequently the earliest legislation on the subject shows that in order to settle the country it was the policy of the Government to distribute land among the settlers, requiring only that they should establish their residences thereon and utilize the land by cultivation and the raising of stock. A four years' compliance with these conditions gave to them the right of ownership in the property, and thereafter it was absolutely at their disposal. This provision of law dates from the year 1513. It appears, however, that at a very early period lands were occupied without what is termed in the laws of the Indies "just and true titles," and the viceroys and presidentes of the audiencias were authorized as early as 1578 to fix a period, whenever they saw fit, within which landholders should present their titles for examination. Those who held under good titles and instruments or by virtue of what is called "just prescription" (*justa prescripción*) were to be protected in their possessions, but lands not held under those conditions were to be restored to the Crown in order that they might be disposed of according to the Sovereign's will.

That the abuses which the law just referred to intended to correct had originated long prior to its date and that in some instances land had been disposed of by sale instead of as gratuities, is evidenced by a reference to sales in a law of 1531, while a century later, during the reign of Philip IV., reference is made to lands that had been acquired during the reign of his predecessors by means of composition.

The word "composition" as here used is a literal translation of the

Spanish word "composición," which had a technical meaning as applied to lands, and may be defined as a method by which the State enabled an individual who held its lands without legal title thereto to convert his mere possession into a perfect right of property by virtue of compliance with the requirements of law. Composition was made in the nature of a compact or compromise between the State and the individual who was illegally holding lands in excess of those to which he was legally entitled, and, by virtue of his compliance with the law, the State conferred on him a good title to the lands that he had formerly held under a mere claim of title.

In 1735 a royal cedula was promulgated requiring that grants of land should be submitted to the King for confirmation, but as a similar provision appears in the Laws of the Indies and at a date long prior to the cedula in question, it would seem there must have been a time when either confirmation by the Crown was not required or else the requirement had been disregarded at a period subsequent to the earlier legislation and prior to the year 1735.

It is a recognized fact that comparatively few holders of real estate in the Philippines can trace their titles to their origin in the Spanish Government, and this remarkable fact exists in the face of the liberal provisions made by that Government enabling landholders to convert their mere rights of possession into legal titles.

Regulations for the composition of State lands, approved by the royal decree of June 25, 1880, seem to have produced for a time a beneficial result and to have awakened a considerable interest in the subject of acquiring formal titles to land. Under this decree a gratuitous title to public lands was issued (1) to those who had possessed such land without interruption for ten years under a claim of title in good faith; (2) to those who had no title but who had possessed the ground for twenty years and had cultivated it for three years immediately preceding application; (3) those who had possessed the land for thirty years although without cultivation.

Under this order, which was continued in force with minor modifications until February 13, 1894, a very considerable number of persons perfected their title to public lands. Despite the liberal spirit which dictated the law, however, and the manifest advantages it offered to the people, it failed to accomplish in any large sense the purpose intended. This was due, as was so often the case with Spanish legislation, not to any vice in the law, but to the manner of its application. The officers intrusted with giving it effect instead of facilitating the dispatch of claims too often used the power conferred upon them to further their own ends. Persons seeking adjustment of their claims grew tired of the endless delays and extortions to which they were subjected, and abandoned further efforts, preferring to take their chances as simple squatters.

It has been estimated that in 1894 there were throughout the Islands over 200,000 claims where proceedings had been initiated but not concluded. In 1894 a final effort was made to impress upon the occupants of public lands the urgency of applying for adjudication of their claims. By royal decree issued in February of that year, it was provided as follows:

ART. 19. Parties in possession of alienable crown lands which are under cultivation and who have not obtained nor petitioned for adjustment up to date of the publication of this decree in the Manila Gazette may obtain free title deeds to the property by means of "possessory proceedings," in accordance with the laws of civil procedure and the mortgage law, provided they have fulfilled one of the following conditions:

First. To hold or to have held them under cultivation without any interruption during the last six years.

Second. To have held them in possession uninterruptedly during twelve years, having them under cultivation at the time of the "possessory proceedings" and during the three years preceding thereto.

Third. To have held them in possession openly and without interruption during thirty or more years, although the land has not been under cultivation.

ART. 21. The nonextendible term of one year is hereby granted for the purpose of instituting "possessory proceedings," as referred to in articles 19 and 20 hereof. At the expiration of said year the right of cultivators and holders thereof in obtaining a free title deed to the property shall become extinct and full title to the land shall revert to the State or to the citizens in common.

Notwithstanding the explicit provisions contained in the above order, that with the expiration of one year title to public lands could be acquired only through purchase, comparatively few persons, either of those having unfinished claims or otherwise, instituted proceedings to perfect their holdings.

The number of titles issued under these different orders can not now be ascertained owing to the destruction by fire of the records of the Forestry Office in 1897. The royal decree mentioned (1894) made full provision concerning the sale of Crown lands and constituted the "public-land law" of the Islands upon American occupation.

In 1889 the registration system known as "La Ley Hipotecaria" (mortgage law) was extended to the Philippines. This law furnishes a complete scheme for the recording of ownership to property. Its virtue, however, lies more in theory than in practice, its provisions being too detailed and involved to be readily understood or availed of by a people notably lacking in initiative. Under this law a register of deeds was provided for each province, while a registration book was opened for each municipality within the province. Certain pages and a separate number were allotted to each estate appearing in the register, and thereafter every document referring to the estate, whatever its nature, was entered in the one book and under the one heading. Every document presented for registration was required to contain numerous circum-

stances as a condition for record, it being provided that the registration of any instrument lacking these circumstances not only subjected the registrar to damages but nullified the inscription. The registers were required to determine both the legality of the instrument and the capacity of the parties thereto. It was provided further that no instrument transferring or encumbering property could be registered unless the rights of the party seeking to convey the interest were properly recorded, or if such interest appeared in the name of another person.

From this it will be seen that as to property actually recorded the registration books furnished a complete abstract, and a person could feel reasonably certain as to who was the owner. The difficulty, however, lay in the fact that a vast number of holdings were not of record while the law forbade the registration of instruments dealing with such property until they did appear of record.

To remedy this somewhat anomalous condition the law provided what was known as "possessory information proceedings," by which any person who lacked a record title of ownership, no matter at what period the acquisition took place, was permitted to record his instrument upon proving possession. This was done after a full series of notices and proofs and with the intervention of the State through the department of public prosecution. These "entries of possession" could be converted into records of ownership after the lapse of twenty years, a public proclamation of such intended conversion being first had and there being no record that the prescription had been interrupted. A very considerable number of titles were recorded under this provision, though many who might have availed themselves of the proceeding neglected to do so.

This comparative failure of the people to take advantage of the various liberal decrees and orders of the Spanish Government intended to facilitate the conversion of titles of occupation into titles of record, was due in a measure, as already indicated, to the manner in which such laws were administered. In addition to this was the fact that the necessity for such action was not immediately apparent to the majority of land holders. Owing to the large excess of the public domain over lands reduced to private ownership proceedings were seldom if ever taken to evict occupants of public lands. As their right of possession was usually conceded by their neighbors, deficiency in their titles caused them very little concern. The natural tendency of the people is to postpone action in every matter when such action is not imperative.

Under the Spanish system an individual who desired to take up a piece of government land could do so in any form that suited him. There were at different times limitations as to the amount of land that he might acquire by purchase, at one period it being as much as 2,500 hectares, or 6,175 acres, but there was no restriction as to the form of the tract. The result of this was that the lands were surveyed in every imaginable form, and without any view to a system of connected sur-

veys that would enable them to be easily identified on a general map. Some maps of surveyed lands were filed in the proper offices at Manila, while maps of other lands were only to be found in the provincial records, so that in no one office in the Archipelago could be found the necessary data for the construction of a map showing the condition of existing surveys, and, of necessity, the unsurveyed land of the public domain.

To add to the confusion resulting from the haphazard system of surveys pursued and the imperfect registration of titles, a large portion of the land records which did exist were burned or otherwise destroyed during the revolution against Spain and the subsequent uprising against American authority. In the city of Manila the records have been preserved in fairly complete form, but in the provinces a deplorable condition exists in this regard. The matter of devising some scheme, therefore, by which this paucity of record titles could be overcome, and which would enable purchasers and others to establish indisputable rights to particular tracts of land, early received the attention of the authorities.

After a full investigation of the subject the Commission adopted, on November 6, 1902, an act entitled "An act to provide for the adjudication and registration of titles to lands in the Philippine Islands." This law became effective on February 1, 1903, and is known as the Land Registration Act. A brief description of this law may not be uninteresting to prospective investors in the Islands as well as to those having in mind the welfare of the people of these distant possessions of the United States.

The act is a modification of the so-called "Torrens land system," now generally applied throughout the Australian commonwealth, which has been adopted with marked success in several of the States of our Union. The act adopted by the Commission is modeled after that now in force in the State of Massachusetts.

The pivotal point of the new system of registration, and that which distinguishes it from the system heretofore in use and from those prevailing generally throughout the United States, is that the "title" to the land is registered and not simply the evidences of title. In other words instead of a registration of instruments, the existence of which can be ascertained only at great trouble and expense, there is substituted a registration of title, this title being guaranteed by the Government and evidenced by a certificate which shows upon its face at all times the exact status of the property.

The machinery provided is comparatively simple. There is created a Court of Land Registration which has exclusive jurisdiction of all applications for registration of land under the act, with power to hear and determine all questions arising upon said applications, its decisions, however, being subject to appeal to the appellate court. The act as drawn provides for one judge and an assistant judge, power being conferred upon the Civil Governor to name additional associate judges as



circumstances may require. Provision is made for the appointment by the Civil Governor of one or more examiners of titles in each of the fifteen judicial districts into which the Archipelago is divided. Registers of deeds are provided for every province, who, after any land has been registered within their respective provinces, have the same authority as the clerk of the Court of Land Registration to make all memoranda affecting the title of such land.

The proceedings upon applications for registration are proceedings *in rem* against the land, and the decrees of the court operate directly on the land and vest and establish title thereto.

Applications for registration may be made by all persons legally competent, it being provided, however, that the entire interest in the land must be represented upon the application. The application must be in writing, signed and sworn to by the applicant or some person duly authorized in his behalf. It must contain a full description of the land, its assessed value, a statement of any existing encumbrances, under what title acquired, whether occupied or unoccupied; if occupied, the names and addresses of the occupants together with statement of names and addresses of all adjoining property owners. The applicant must file with his application a plan of the land and all original muniments of title within his control evidencing his claim. It is required that the plan be made from a ground survey and must be signed and dated by the surveyor; it must contain all data necessary to an exact location of the property, particular stress being laid upon the completeness of the plan.

The owner of the land having applied in proper form for the registration of his property, the application, together with all accompanying papers, are referred to an examiner of titles for the district where the land is situated. It is the duty of the examiner to search the records and investigate all the facts in the application or otherwise brought to his attention and file in the case a report thereon, concluding with a certificate of his opinion upon the title. If the report of the examiner is favorable, or in any event if the applicant elects to proceed with the case, notice is served upon all parties interested to appear on or before a certain date (not less than twenty nor more than sixty days), to show cause, if any they have, why title should not be issued as prayed for in the application.

Service of notice is had by publication in two newspapers, one printed in English and one in Spanish, by posting a copy of the notice in a conspicuous place upon each parcel of land included in the application, and by mailing a copy of such notice, by registered mail, to every person named in the application as occupant, adjoining owner, or incumbrancer, and to such others as may from the report of the examiner of titles appear to have an adverse interest in the land.

The notice runs to all persons named in the application, "and to all whom it may concern." Any person claiming an interest, whether named

in the notice or not, may appear and file an answer on or before the return day or within such further time as may be allowed by the court. The answer shall state all the objections to the application and shall set forth the interest claimed by the party filing the same. If no person appears and answers within the time allowed, the court may at once, upon motion of the applicant, no reason to the contrary appearing, order a general default to be recorded and the application to be taken as confessed. By the description in the notice "to all whom it may concern," all the world are made parties defendant and are concluded by the default and order. After such default and order the court may enter a decree confirming the title of the applicant and ordering registration of the same. The court is not bound by the report of the examiner of titles, but may require other and further proof.

The law contains full provision as to the procedure in case the application is contested. Every decree of registration binds the land and quiets title thereto and is conclusive upon and against all persons, including the Government and all its branches.

If a decree of registration is obtained by fraud the aggrieved party may file petition for review within one year after the entry of decree, provided no innocent purchaser has acquired an interest. If there is any such purchaser the decree can not be opened but remains in full force and effect forever, the person aggrieved being relegated to his action for damages against the person perpetrating the fraud.

The decree of the court contains a description of the land as finally determined by the court, with a statement, in their relative priority, of all particular estates, mortgages, easements, liens, attachments, and other incumbrances, if any, to which the land is subject. A certified copy of this decree is sent by the clerk of the court to the register of deeds for the province where the land lies, who transcribes same in a book called the "Registration Book," in which a leaf or leaves in consecutive order are devoted exclusively to each title. This entry becomes the original certificate of title and is signed by the register and sealed with the seal of the court. The certificates are numbered consecutively beginning with number one. The register of deeds in each case makes an exact duplicate of the original certificate, marking it "Owner's duplicate certificate," which is delivered to the owner of the land. Thereafter, when any transaction is had affecting the land, the owner's duplicate certificate must be presented to the register of deeds, together with the instrument affecting the title. The register enters upon the original certificate of title, and also upon the owner's duplicate certificate, a memorandum of the encumbrance, the time of filing, and the file number of the instrument, and signs the memorandum.

The act of registration is the operative act to affect the land, no dealing therewith being effective even as between the parties to the contract until a proper note is made in the registration book and upon the cer-

tificate of title. It follows as a consequence that no title can be acquired by prescription or adverse possession as against the owners of registered land. The original certificate in the registration book and the duplicate held by the owner furnish at all times a complete abstract of the title. In case of sale the owner's duplicate certificate is surrendered and canceled and a new certificate entered in the registration book and duplicate issued to the grantee.

The Registration Act contains full and explicit provisions governing the action of registrars and of interested parties in the matter of mortgages, leases, attachments, trusts, probate, and other transactions affecting property interests. Dealings with registered land are rendered as simple and as secure as ordinary dealings with personal property, while the services of an abstract company or a lawyer are not necessary to avoid mistakes.

Titles to lands registered by the Court of Land Registration are guaranteed by the Government. Upon the original registration, and also upon the entry of a certificate showing title as registered owners in heirs or devisees, there is paid to the register of deeds one-tenth of 1 per cent of the assessed value of the real estate, on the basis of the last assessment for municipal taxation, as an assurance fund. Any person who without negligence on his part sustains loss or damage through any omission, mistake, or misfeasance of the clerk or register of deeds or of any examiner of titles in the performance of their respective duties under the provisions of the act, and any person who is wrongfully deprived of any land or any interest in land without negligence on his part, through the bringing of the same under the provisions of the act, may bring an action against the Treasurer of the Philippine Islands for the recovery of damages, to be paid out of the assurance fund.

The system furnishes, therefore, a guaranteed title which can be easily and infallibly ascertained. It insures a saving of time and expense in all dealings with land, thus encouraging the purchase and sale of property. It renders real estate a safe mortgage security, making loans easy and reducing rates of interest.

Exclusive of the cost of survey and the fee paid to the assurance fund, it is estimated that the entire expense of registration should not exceed \$20. Few conveyances of title can be made under the old system for less than this sum, while the saving in all future dealings with the property will be such as to render the registration of title a profitable investment.

The registration of titles under the new act is left optional with landowners, the old system of registration being continued as to lands not brought under its provisions. It is expected, however, that the advantages offered by the new system over the present unsatisfactory condition of affairs will early recommend themselves to property owners. In the

meantime, however, it furnishes an adequate measure of relief to all persons buying lands, as it is within their power to insist, as a condition of purchase, that the lands be first registered under the Land Registration Act; in fact the present chaotic condition of titles in the Islands will facilitate the spread of the new system by making registration thereunder imperative on the part of all those seeking to negotiate or encumber their properties.

Registration under the act has been made compulsory as to all persons claiming lands within military or civil reservations. This requirement was rendered necessary to enable the authorities to deal with the true owners in negotiating for the purchase or condemnation of property within such reservations. It is also provided by the act that whenever public lands in the Islands are sold the same shall be brought forthwith under the operation of the act and shall become registered land. Inasmuch as over 60 per cent of the lands of the Islands are estimated to belong to the Government, a large field of usefulness is at once opened for the application of the new system.

The difficult problem confronting the Government, in view of the existing condition of public surveys and records, is to determine definitely what are public lands and what are private lands or lands subject to private equities. It would seem necessary, before there can be any regular or permanent survey of public lands in the Islands and a placing of same upon the market, that all questions involving private claims should be determined. To do this and to effectually segregate Government land from that of private ownership, would require that the registration of title under the Land Registration Act be made compulsory and that all land not so registered within a prescribed period be declared public lands. Such action has not yet been taken.

Legislation governing the sale, lease, and other disposition of the public lands of the Islands, as also the settlement of the large number of imperfect claims initiated during the Spanish rule, is now being considered by the Commission (August, 1903). As to the latter class of claims the act of Congress approved July 1, 1902, entitled "An act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," contains the following provisions:

SEC. 14. That the Government of the Philippine Islands is hereby authorized and empowered to enact rules and regulations and to prescribe terms and conditions to enable persons to perfect their title to public lands in said Islands, who, prior to the transfer of sovereignty from Spain to the United States, had fulfilled all or some of the conditions required by the Spanish laws and royal decrees of the Kingdom of Spain for the acquisition of legal title thereto yet failed to secure conveyance of title; and the Philippine Commission is authorized to issue patents, without compensation, to any native of said Islands, conveying title to any tract of land not more than sixteen hectares in extent which were public lands and had

been actually occupied by such native or his ancestors prior to and on the thirteenth of August, eighteen hundred and ninety-eight.

It is now the purpose of the Commission to confer jurisdiction upon the Court of Land Registration to hear and determine the first class of claims referred to above, i. e., claims initiated under Spanish law but not completed. As there are a vast number of these claims outstanding, another large field will thus be opened to the operation of the Land Registration Act.

The provisions of the act of Congress, cited above, as to public lands, are as follows.

SEC. 13. That the Government of the Philippine Islands; subject to the provisions of this Act and except as herein provided, shall classify according to its agricultural character and productiveness, and shall immediately make rules and regulations for the lease, sale, or other disposition of the public lands other than timber or mineral lands, but such rules and regulations shall not go into effect or have the force of law until they have received the approval of the President, and when approved by the President they shall be submitted by him to Congress at the beginning of the next ensuing session thereof, and, unless disapproved or amended by Congress at said session, **they** shall at the close of such period have the force and effect of law in the Philippine Islands: *Provided*, That a single homestead entry shall not exceed sixteen hectares in extent.

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SEC. 15. That the Government of the Philippine Islands is hereby authorized and empowered, on such terms as it may prescribe, by general legislation, to provide for the granting or sale and conveyance to actual occupants and settlers and other citizens of said islands such parts and portions of the public domain, other than timber and mineral lands, of the United States in said Islands as it may deem wise, not exceeding sixteen hectares to any one person and for the sale and conveyance of not more than one thousand and twenty-four hectares to any corporation or association of persons: *Provided*, That the grant or sale of such lands, whether the purchase price be paid at once or in partial payments, shall be conditioned upon actual and continued occupancy, improvement, and cultivation of the premises sold for a period of not less than five years, during which time the purchaser or grantee can not alienate or encumber said land or the title thereto; but such restriction shall not apply to transfers of rights and title of inheritance under the laws for the estates of decedents.

SEC. 16. That in granting or selling any part of the public domain under the provisions of the last preceding section preference in all cases shall be given to actual occupants and settlers; and such public lands of the United States in the actual possession or occupancy of any native of the Philippine Islands shall not be sold by said Government to any other person without the consent thereto of said prior occupant or settler first had and obtained: *Provided*, That the prior right hereby secured to an occupant of land, who can show no other proof of title than possession, shall not apply to more than sixteen hectares in any one tract.

The provision of the above act of Congress which restricts the ownership of land by corporations to 1,024 hectares (2,500 acres) has been subjected to severe criticism by those familiar with conditions in the Islands. It is asserted that in a country where facilities for transpor-

tation must be created, where laborers are scarce and inefficient, and where returns are necessarily delayed, a tract of 2,500 acres will not justify the outlay necessary to create a plant large enough for successful work. This view is held by the Philippine Commission, and, apparently, by all those familiar with local conditions. With 61,000,000 acres of public land and a scarcity of labor, the fear of undue exploitation of the Islands entertained by some people in the States would seem to be unfounded.

## Chapter X.

### FAUNA.

[Revised by Charles S. Banks.]

Philippines rich in birds but poor in mammals—Bornean character of the mammals—Sea mammals—Horses—Wild hogs—Deer are abundant—Sheep and goats—Dairies needed—The carabao—The timarau of Mindoro—Description of a timarau hunt—Absence of elephants—Rats—Squirrels—Fruit bats—But one species of monkey—Birds of the Philippines—Bird fauna of Luzón, Mindanao, other islands—Regions yet unexplored—Sunbirds—Mound building birds—Shore birds—Ducks—Edible bird's nests—Reptiles—Pythons—Lizards—Crocodiles—Turtles—Fishes—Methods of fishing—Shells—Pearl oysters—Insects and other Arthropoda.

Although the zoology of the Philippine Islands has been more carefully studied than have their botany and geology, still the work may be said to have only fairly begun, even in the case of those groups of animals which have been most carefully investigated. In general it may be said that the Philippines are characterized by a scarcity of mammals, by a rich bird fauna, which includes a very high percentage of species peculiar to the group, and by the enormous abundance and great variety of the land mollusca, the Arachnida and insecta.

The distribution of the mammals and birds within the limits of the Archipelago is an interesting study, which has already thrown much light on the probably past geological history of the group. In general it may be stated that the Philippines politically speaking and the Philippines zoologically considered are not identical areas, for Balábac, Palawan, and the Calamianes Islands are strongly characterized by the presence of numerous Bornean forms which are absent from the remaining islands of the Archipelago. Although the Philippines are commonly held to form an eastern extension of the Indo-Malayan subregion, it is a fact that at least among the birds and mammals there is a large amount of specialization in the islands to the eastward of the Balábac, Paragua, Calamianes Group. It is not intended in this short article to enter upon a detailed description of the fauna of the Philippines, but rather to mention some of the more important and interesting forms that are to be found therein.

As stated, the Islands are very poor in mammals, and this fact is the more surprising when compared with the neighboring Island of Borneo,

which is rich in mammals. They are undoubtedly well adapted to a large and diversified mammalian fauna, and the only plausible explanation of the scarcity of forms is to suppose either that they have never been connected with Borneo and the Asiatic continent or that, if at one time connected, they have since been subjected to such subsidence as to destroy the greater part of their mammalian fauna.

There has been, however, apparently a comparatively recent connection of short duration between the Calamianes, Paragua, Balábac, and Borneo. This would account for the strong Bornean character so plainly noted in the mammals of these islands.

There are no marsupials in the group. The edentate, or toothless, mammals, are represented by the pangalin, which is abundant in Paragua and the Calamianes. This curious animal, known to the natives as balington, has its whole dorsal region protected by thick scales, and when molested rolls itself up into a ball. It feeds at night, living largely on ants, which it licks up with its long, protrusible, sticky tongue.

In the seas of the Archipelago are found the dolphin, the cacholet, from which spermaceti is obtained, whales, and, finally, the dugong, or, as the natives call it, the woman fish. This animal is herbivorous, its flesh is edible and not unlike beef, and it is thought that it may have contributed to the myth of the mermaid. Beads are made by the natives from its tusks, and it is said that this animal is constantly growing scarcer in these waters.

The horses which are found in the Philippines were imported from Mexico, China, or Borneo. They are of small size, but well formed and hardy. But little care has been exercised in breeding, and they might doubtless be greatly improved. Neither American, Australian, or European horses have thus far flourished in the Islands, though a cross between imported and the native horses ought to produce a result that would be a decided improvement. Many hundreds of horses used by the Quartermaster's Department and the cavalry have died of surra.

Wild hogs of at least two species are found. On some of the islands, notably Tawi-Tawi, they are very numerous and often cause the natives considerable trouble and loss by destroying their crops at night. They are much hunted, both on this account and for the sake of their flesh, which is excellent. The boars sometimes attain an immense size, and hunting them is attended with no little danger. In Tawi-Tawi, during the season when the dureian tree ripens its fruit, the wild hogs become so fat that the natives insist that they die of heat when hard pressed by dogs. The bobisussa of Célebes, or the horned hog, whose tusks sometimes attain a length of 12 inches, has been said to occur in Mindanao, but the statement lacks confirmation. Domestic hogs of black color are to be found in numbers in every native village, and they cross more or less freely with the wild species. Few white men who have observed these animals acting as scavengers care to eat their flesh.



Deer are extremely abundant in many parts of the Archipelago, and their flesh, like that of the wild hog, forms an important article of food for the natives, while their skins and horns are put to various practical uses. In Joló there is a beautiful axis deer which has almost certainly been introduced by man. Neither this nor any other species occurs on the Island of Tawi Tawi. In Basilan, Mindanao, Leyte, Sámar, Luzón, Mindoro, and the Calamianes there are deer of red or brown colors, without spots when grown. The exact number of species and their respective ranges have never been exactly determined. In Masbate, Panay, Guimará, and Negros there is a beautiful dark-colored deer marked throughout life with buff spots.

Sheep and goats have been imported from China and Mexico, and while the latter have done well the former have not flourished, but it is reported that experiments made with them in the highlands of Benguet have given good results, though the Tropics can not be considered as a good wool country nor is the native demand great.

Humped cattle are raised on most of the Islands, notably in Masbate, the Calamianes, and on some of the small islands north of Luzón. They are raised for their flesh, hide, and horns, and but little attention is given to their milk-giving capacity. Australian cattle have been brought to the Islands from time to time, but have suffered from disease. The establishment of good modern dairies within easy reach of Manila and other large cities would seem to be a practical and remunerative enterprise. At present cow's milk is difficult to obtain, while cream, fresh butter, and pressed cheese come from Australia.

The most important domesticated animal in the Philippines is the water buffalo or carabao. It is found wild in Luzón, Mindoro, Masbate, Negros, and Mindanao and probably in other islands of the group, but it is believed that the wild herds have originated from domesticated animals which escaped after being imported into the Islands. It is said that Mindoro herds sometimes number as many as 200. Although bullocks are sometimes used as draft animals, the carabao is par excellence the beast of burden in the Philippines. They are strong but sluggish in their movements, and can not long endure the heat of the tropical sun when at work. If forced to continue their work they are liable to lie down in the first puddle or stream and refuse to get up. If pushed too hard they die of the heat, and in emergency water should be poured over their heads and along their backs from time to time. If left to themselves they will pass the greater part of the day in a mud bath.

They are wonderful swimmers, and do not hesitate to cross 10 miles of open sea. When feeding in the water, they frequently submerge their heads for some time in order to get at the roots of water plants. It seems impossible to mire them, and on this account they are extremely useful during the rainy season. They breed freely, but are often swept off in great numbers by epidemics, like that of the rinderpest, which

it is estimated has cost the lives of 90 per cent of the animals in the Islands during the last three or four years. They are often cared for and driven by small children, who clamber up their hind quarters to their backs, supporting themselves meanwhile by hanging on to their tails. In spite of their apparent gentleness they have been known to attack and kill their owners, and, it is said, in the more remote towns they sometimes display a violent dislike for white men, occasionally stampeding at the mere smell of one. Their flesh is tough, stringy, and rather tasteless.

Hunting wild buffalo is much more exciting and dangerous than is usually thought. When wounded they charge viciously, and if they once succeed in getting into close quarters it is all up with the hunter. They have been known to kill men after being shot through the heart. In hunting them the natives sometimes employ tame buffalo as decoys at night. The tame animals feed along, slowly approaching the wild one up the wind, and the hunter creeps along in his shadow. When close alongside he slips around and attempts to hamstring the buffalo with two blows of his bolo. If he fails his carelessness is apt to cost him his life. In the Calamianes Islands long fences are sometimes constructed, gradually running together and leading into a pen, and drives are held which sometimes result in the capture of a number of animals. The younger ones are readily domesticated.

Without doubt the most interesting mammal in the Philippines is a small island buffalo, called by the natives timarau, peculiar to the Island of Mindoro. In color it resembles the water buffalo, but is much smaller. Its short, strong, and sharply pointed horns run almost directly backward, somewhat like those of an antelope. Unlike the carabao, it never bathes in the water or wallows in the mud. It sleeps during the day, hidden away in the dense jungle. At night it comes forth to feed, and some time before morning it visits a neighboring water course in order to drink. Hunting it is both difficult and dangerous, so much so, in fact, that it is but recently that a few specimens have been obtained for scientific investigation.

The timarau is short-legged, and in going through the forests it puts its nose close to the ground and burrows under the creepers and dense vegetation which slip along its horns and back and snap down behind it, leaving no passageway at all. In following such a trail the hunter is frequently compelled to work his way along flat on his belly, and at the best will frequently have to go for half an hour at a time on all fours.

The timarau's sense of hearing and smell are exceptionally acute, and the snapping of a dry twig or a puff of wind in the wrong direction often makes half a day of work useless. When the animal has once been alarmed the hunter may as well abandon the trail, for the timarau will often run 10 miles without stopping, tearing its way through the forest, and

exhibiting an amount of strength utterly out of proportion to its size.

Before lying down to sleep the timarau usually turns about and faces its own trail. The hunter must creep within 30 or 40 feet of his game before he can see it, and he must then shoot for the brain, as the animal is almost certain to charge if not instantly killed, and at such short range there is but little time for a second shot. When hit through the lungs it will run for miles, and it will often go a hundred yards after being shot through the heart.

It is ordinarily met with singly, though it is said they go in herds in the tall grass on the west coast of Mindoro. The natives are afraid of them and not without reason.

All attempts to domesticate them have failed, for, when taken in snares or pitfalls, they struggle until they kill themselves, and young calves when given to a female carabao to raise are said to have attempted to attack them and afterwards to have refused all food.

The Hon. Dean C. Worcester, a member of the Philippine Commission, gives in his interesting book, *The Philippine Islands and Their People*, the following graphic account of a timarau hunt:

For four long weeks we had hunted timarau without success. Our knees and elbows were worn raw from crawling through the jungle. The leeches had bled us, the tungan had burrowed into us, and the ants had stung and bitten us to their hearts' content. Again and again we had crept up within a few feet of some wily old bull, when the snapping of a dry stick or a puff of wind carrying the scent in the wrong direction had alarmed him and he had torn away through the dense vegetation without giving us so much as a glimpse of himself. At last, however, our day came.

A fine rain had put the ground in excellent condition for tracking. It was my turn to take the trail, and I said jokingly to Bourns as I started that we would have timarau steak for supper. Within a hundred yards of camp the old *práctico* struck the track of a large bull, and we were soon crawling on all fours through a fearful tangle, or worming our way, stretched flat on the ground. The work was terribly hard and the heat most trying, but from start to finish we exercised the utmost care, pushing ahead slowly and in absolute silence.

After three hours of trailing, Fulgencio suddenly stopped and looked back at me, his face working with excitement. It took several minutes to cover the short distance that separated us, and not so much as a leaf rustled under me. The old man pointed silently, and, looking in the direction indicated, I saw an indistinct black mass lying on the ground. Our timarau was asleep within 40 feet of us. For a long time I could not make out which end of him was which. The dense vegetation shut off the light so that I could not see distinctly. But it was no time for mistakes, for I was so bound down with rattans that I could not stand erect without working back some little distance, and a wounded timarau has an uncomfortable habit of charging. A shot through the brain is the only thing that will put one of the creatures out of commission promptly.

At last I thought I made out his head facing directly toward us, and, taking careful aim, I fired. The smoke settled thickly in front of me, so that I could see nothing, but I heard a tremendous crashing in the brush, and, backing hastily out of the rattans, stood up, expecting every instant to see a pair of horns coming through the smoke. There was more crashing in the bushes, but after a moment or two I thought I heard the timarau fall. Crawling in carefully, I found him on

the ground with blood flowing from his nostrils, and, stealing up within 10 yards, I sent a bullet into his eye, thinking to end his misery. To my utter amazement he sprang to his feet, whirled around, and tore off through the brush, disappearing in an instant. I began to think I had been shooting at a phantom timarau, but a phantom would hardly have left a bloody trail. We followed on warily and not 40 feet away found an old bull stone dead.

This curious animal presents a zoological puzzle. Its extermination by man would be well-nigh impossible, so long as a bit of jungle remained on an island; yet it is not found in Luzón, which at one point is but 10 miles distant from Mindoro nor does it exist in any other island of the Archipelago. The German collector, Dr. Platen, who had successfully hunted the anao of Célebes, and who secured four or five specimens of the timarau in Mindoro, insisted that the two are identical.

Elephants were at one time imported into Joló, and, it is said, into Cebú also, but as they proved to be a nuisance rather than a benefit to the country they were killed and none now exist in the Archipelago.

Domesticated rabbits are found in the Islands, but there are no wild ones.

One species of porcupine is found, but it is confined to the Palawan-Calamianes Group.

The house rat, which has been introduced by man, is a common nuisance. There are a number of wild species of rats and mice, some of which occasionally become so numerous as to seriously damage the sugar cane and rice fields.

Squirrels occur in the eastern chain of islands from Luzón to Basilan and in the Paragua-Calamianes Group. In the southern islands there is a tiny species no larger than a mouse. Very large flying squirrels are found in Paragua and Mindanao. They are nocturnal in their habits. There are no squirrels in Cebú, Negros, Panay, Masbate, or Mindoro. Squirrel shrews are found in the Palawan-Calamianes Group and the true shrews at various points in the Archipelago.

Among carnivorous animals may be mentioned the bintorang and a species of otter, also two species of civet cats which range throughout the group, and a true wild-cat of small size, which has been found in Paragua, Panay, and Negros and is said to exist in Cebú.

Bats occur in great numbers, and there are numerous species, a number of which are peculiar to the Archipelago. There are extensive bat caves in Guimarás, Cebú, and Siquijor. The guano deposits in these caves have never been worked, but would doubtless be of considerable commercial value. At numerous places in the Archipelago there are immense colonies of large fruit bats, which pass the day hanging head downward in their favorite trees, which they frequent in such numbers as to fairly blacken them. At dusk they may be seen rising in great swirling columns high into the air, and then setting off in different directions in search of food. The natives eat the flesh of these bats, but travelers who have tasted them do not speak highly of the meat as a delicacy.

The Prosimiæ are represented by *Galeopithecus philippensis* (Wath), the so-called flying lemur; the tarsier, *Tarsius spectrum* (Geoff.), and a small lemur, *Nycticebus tardigradus* (Fisch.). The latter is found only in Tawi-Tawi. It is known to the natives as kokam and to the Spaniards as el vergonzoso, on account of its curious habit of hiding its head when approached by man and unable to escape. The galeopithecus is found from Basilan to Luzón, and also in the Island of Bohol. It has membranes like those of a flying squirrel, which not only extend between the legs but reach to the tip of the tail. By the aid of these membranes it is able to make immense leaps through the air, pitching down sharply at first, and rising again as it approaches the tree on which it desires to alight. It is nocturnal in its habits, and its soft fur is highly prized in Europe.

So far as known, the tarsier, a most curious little mammal, is confined to Basilan, Mindanao, Sámar, Leyte, and Luzón. The Filipinos insist that it feeds on charcoal, and this curious belief is held by natives of other regions where the tarsier is found.

In spite of all that has been said to the contrary, but a single species of monkey has yet been discovered in the Philippine Islands. It is known to the natives as maching, or matsin, and its scientific name is *Macacas philippensis* (Geoff.). It is of medium size, and is to be found on every island of any importance in the entire group. It is commonly tamed by the natives, who use it to rid their heads of objectionable tenants. It not infrequently inflicts considerable damage to growing crops. Its flesh is sometimes used as an article of food. A black monkey, *Cynocephalus niger* (Desm.), of Célebes, has been said to occur in Joló and Mindanao. It is undoubtedly sometimes brought to the Islands, but there is no reason for believing that it occurs wild in any of the Islands, and this as well as other species that have been assigned to the Philippines by different authors are myths pure and simple.

The birds of the Philippines have been studied more thoroughly than any other group of organisms. They early attracted the attention of naturalists, beginning with Sonnerat. Since his day Cuming, Meyer, Steere, Everett, Platen, Mosely, Bourne, Worcester, Whitehead, and others have contributed more or less extensively to our knowledge of the avifauna of the Archipelago. The result has been to raise the total number of species to about 600, of which at least 325 are peculiar to the Philippines. With few exceptions, these peculiar species are land birds, and the study of their distribution has brought out some interesting facts. Certain islands or groups of islands have been found to have characteristic forms of their own which do not spread to other islands of the group. Thus, Balabac, Calamianes, and Paragua have several peculiar species, and the bird fauna of this region, on the whole, agrees with the mammalian fauna in showing strong evidences of a Bornean origin.

The deep water between the Calamianes Group and Mindoro marks

the northern extension of these Bornean forms into the Philippine group. None of them reach the latter island, which has eleven peculiar species of its own; although, as might be expected, a number of characteristic forms have made their way across the few intervening miles of sea, aided, no doubt, by Isla Verde and other small islands. Many of the most important Luzón forms are absent, however, and these facts, together with the occurrence of the remarkable timarau and the absence of most of the characteristic Luzón mammals, combine to give Mindoro a place by itself.

As might be expected, the great Island of Luzón, with its high mountains and mighty forests, its extensive open plains, its important fresh-water lakes and large rivers, has a very rich bird fauna, and it has been more carefully studied than has that of any other island in the Archipelago. Two hundred and eight-six species of birds have been recorded, of which 136 are peculiar to the Philippines and 51 are not known to occur outside of Luzón and the small islands immediately adjacent thereto.

A close relationship has been shown to exist between the eastern islands from Luzón to Basilan. The greatest differences occur between Luzón on the one hand and Samar, Leyte, and Panay on the other. These three islands form a well-defined zoological area characterized by the presence of 22 peculiar species; and less than 63 Luzón forms have as yet been found in Samar.

Mindanao is, next to Luzon, the largest island in the Philippines, and like the latter island, has a diversified surface, with high mountains, extensive forests, and open plains. Much doubtless remains to be done before the study of the birds of this island will have been completed, and its highland avifauna is yet unknown. Two hundred and seven species of birds have thus far been found on the island.

The small Island of Basilan probably once formed an extension of the peninsula which at present ends at Zamboanga. There are 17 species of birds peculiar to Mindanao and Basilan, while 13 more occur in these islands and range to the northward, but do not extend into the Joló-Tawi-Tawi Group. Apparently, however, the separation between Mindanao and Basilan has endured for a considerable time, as five peculiar species have been developed in the latter island and eight in the former, while a number of species closely allied to or identical with Samar-Leyte forms occur in Mindanao which are absent in Basilan, apparently indicating a relatively recent connection between the former islands and those lying to the northward. With but a single exception every one of the peculiar Samar-Leyte species is known to have a close ally of the same genus in Mindanao.

It is only within a few years that the birds and mammals of the Joló-Tawi-Tawi Group have been investigated. The result has been to show conclusively that these islands belong to the Philippines zoologically as

well as politically. Bornean forms are conspicuous by their absence, the mammals of that island being represented only by a lemur, and the birds by a few unimportant forms; while 53 characteristic Philippine species have been accorded from Joló and 51 from Tawi-Tawi. This group has 12 well-marked peculiar species of its own, and many of the characteristic Mindanao-Basilan forms are lacking, so that it forms a well-marked area by itself.

The central islands of the Archipelago—Panay, Guimarás, Negros, and Masbate—have been shown to constitute another sharply defined area, characterized not only by the occurrence of 30 peculiar species of birds but by the absence of important genera and even whole families which are represented in the eastern chain of islands.

As already noted, they also lack most of the mammals characteristic of the region last referred to. They have no squirrels, and *Galeopithecus Tarsius* and *Ctenomys* do not occur. The wild cat of the central Philippines is not known to occur in the eastern islands, and a very well-marked species of deer is peculiar to the former group.

Curiously enough, the Island of Cebú stands by itself, although the greatest width of the channel separating it from Negros is hardly more than 20 miles, while at one point it narrows to 4. It is very deep, however, and has doubtless long existed. As a result Cebú possesses no less than 9 striking species of birds not known to exist elsewhere in the world, and lacks not only important genera but even whole families, which are represented in the Panay-Negros-Masbate Group.

The land birds of the Philippines are not driven from north to south and from south to north again by changing seasons, as in the United States, and a comparatively small expanse of salt water forms a barrier which many of them can not or will not cross, while it effectually checks the migrating of many mammals. The degree of difference between the birds and mammals of the natural zoological areas into which the islands of the Philippine Archipelago fall may therefore be taken as a fair index of the duration and completeness of the separation which has existed between them.

Much still remains to be done in the study of the birds and mammals of the Archipelago. The connection with Formosa on the north has never been worked out, while that with Célebes on the south has been studied incompletely. The highlands of many of the larger islands of the group are still nearly or quite unexplored, and many of the smaller islands are as yet wholly unknown. It is probably safe to say that nowhere else in the world does nature offer a more favorable opportunity for the study of the vexed question as to the relationship between environment and species formation in the case of the higher animals.

The Islands abound in beautiful birds, as well as in species which are interesting on account of their peculiar habits, while a number of forms are in one way or another of considerable importance to man. Only a

few of these can be mentioned. It should be stated, however, that the assertion that birds of paradise, humming birds, and the lyre bird are found in the Philippines is utterly without foundation. Instead of humming-birds there are sun birds, conspicuous for their beautiful colors, and feeding from flowers, as do the hummers, but quite without their remarkable powers of flight.

Among the most remarkable birds of the group are the mound builders, *Megapodius cumingi* (Dillwyn), known to the natives as tabón. These singular birds burrow into the sand along the beach or the soft earth of the forest, and deposit their eggs, which are very large and out of all proportion to the size of the birds, 2 or 3 feet below the surface. The eggs are very rich in yolk, and the little birds are highly developed when hatched. They dig their way to the surface, take to the brush, and shift for themselves from the day of their birth. A number of pairs often nest in the same spot to which they constantly return. Each time an egg is deposited the parent birds scratch dirt over the place, and a mound of gradually increasing size is thus formed, which sometimes attains a diameter of 12 or 15 feet and a height of 4 or 5. The eggs of the tabón are highly prized by the natives as an article of food.

The jungle fowl *Gallus gallus* (Linn.) abounds throughout the Archipelago. This fowl is presumably the ancestor of our domestic breeds, and the cocks and hens somewhat closely resemble red leghorns. They are sometimes caught and domesticated, and the cocks are even trained to fight. They cross freely with the domestic fowls. The cocks are extremely pugnacious, and the natives obtain them in considerable numbers by the use of individuals that have been trained as decoys.

There are no less than 35 species of pigeons and doves known to inhabit the Philippines; many of them are most beautifully colored, and the flesh of all of them is edible. Several of the species are quite large. This is notably the case with the 6 representatives of the genus *Carpophaga*, which are collectively known to the natives as balud. The splendid Nicobar pigeon is especially worthy of mention on account of its beautiful changeable hues, which vary from deep green to fiery copper red. There are 15 species of rails, coots, and gallinules. Gulls and terns are poorly represented.

Snipe, plover, turnstones, and shore birds in general are very abundant along the coasts during the cold season in Asia, but the majority of the species migrate northward with the oncoming of the hot season. The Asiatic snipe affords splendid shooting in November, December, and January, and the beautifully painted snipe is resident in the Islands throughout the year. The herons and bitterns are represented by 15 species of the most varied forms, size, and color. There is but one stork, and it is comparatively rare.

Five species of ducks are recorded from the Islands. One of these, a fine mallard, is peculiar to the Philippines, and affords fine shooting.



The birds of prey number no less than 45 species, of which 22 are peculiar to the Philippines. In size they vary from the tiny falcon, the size of a sparrow, up to the immense monkey-catching harpy eagle, which is so strong and active that it seizes monkeys as they leap from tree to tree.

It is one of the most difficult birds to kill, and thus far but two specimens of it have been secured. The first was obtained by the Menage expedition near Catbalogan, Samar, in 1892, and the second was obtained by the English naturalist, Mr. John Whitehead, several years later.

Another family well represented is the kingfishers. Of these there are 21 species, all but six of which are confined to the Philippines. Many of these are most beautifully colored, and not a few feed on insects, larvæ, etc., in the forests, never "fishing" at all. There are 12 species of hornbills, not one of which is found outside of the Philippines. These birds have most singular breeding habits; the males wall up the females in hollow trees when the latter are ready to attend to their maternal duties, by filling up the openings through which they enter with clay, leaving only small holes through which they can pass food to their imprisoned wives.

There are a number of species of frogmouths, bee birds, night hawks, and swifts. One of the latter, *Collocalia troglodytes* (Gray), is especially interesting, since it constructs the edible nests so highly prized by the Chinese for food. These nests, which are composed of a gelatinous secretion from the salivary glands of the birds, are usually placed in the hollows of steep cliffs or in limestone caves. When quite fresh and clean they sometimes bring more than their weight in gold. The best nests are obtained on the precipitous sides of Peñon de Corón, between Culión and Busuanga, where the natives gather them at no little personal risk. Good nests are also to be had in Guimarás, Siquijor, and at other points. When persistently robbed the birds help out their supply of secretion by using bits of moss, grass, etc., and it is perhaps this fact which has given rise to the somewhat wide spread belief that their nests are made of "sea moss." Among the remaining forms there may be mentioned 21 species of cuckoos, 1 cockatoo, 19 parrots and paroquets, 19 woodpeckers, barbets, broadbills, starlings, orioles, weaver finches, larks, nuthatches, 24 species of beautifully colored sun birds, and 23 flower peckers, titmice, shrikes, tailor birds, thrushes, fruit thrushes, fairy bluebirds, firebirds, 42 flycatchers, 4 swallows, and 5 species of most beautifully colored pittas, or ant thrushes, as well as a large number of birds belonging to the *Timeliidæ*, and several other families for which English names can not readily be supplied.

The breeding habits of the tailor bird are particularly worthy of note. There are 9 species of the genus *Orthotomus* in the Philippines. So far as their breeding habits are known, they all stitch together green leaves by piercing the edges with their long, slender beaks and passing thread obtained from spider webs, cocoons, or other sources back and forth

through the holes thus made. As the leaves remain attached to the branches and are in no wise injured by this process, they form a green pocket, within which the nest is so perfectly concealed that it is almost impossible to discover it. Although the birds are quite common their nests are extremely difficult to obtain.

The reptiles and batrachians of the Philippines have been but little studied; nevertheless a large number of forms is known of which mention will be made of the more important. The largest snake in the Archipelago is the python, known to the natives as sauá. It is not uncommon to see small specimens offered for sale in the larger towns, where they are put in storehouses and over the ceilings of rooms in dwellings in order that they may keep down the pest of rats. As they grow larger they prey upon chickens and pigs, and specimens which have developed a taste in this direction often cause much annoyance in the native villages. In the forests of the Archipelago they sometimes attain enormous size. These very large specimens live on wild hogs, monkeys, and deer. They often have fixed abiding places, called by the natives their "houses," in the shape of caves in the limestone rocks or hollows in large trees, to which they return after gorging themselves with food.

The most extravagant tales are told by the natives as to their size, and it is not uncommon to hear of specimens "50 feet long, with eyes like saucers, and heads as big as demijohns." Two specimens were obtained by the Menage scientific expedition in 1892, one of which measured 22 feet 8 inches in length, and the other 22 feet 6 inches. Each of these specimens had a maximum circumference of 24 inches with the stomach entirely empty, and Worcester secured one of about the same size in Paragua.

They are particularly numerous in the Calamianes Islands, Basilan, Mindanao, and it is said, also in Bohol. Their abundance in any given locality seems to be largely a matter of food supply, and at times they occasion the loss of cattle by killing their young animals, and they have been known to attack and kill human beings.

Among the nonvenomous serpents there is a small group of some 10 species, representing four genera, which are exclusively confined to the Philippines. There are also numerous venomous serpents. The annual mortality from snake bites is said to be great in the little Island of Lubang, but it is certainly not serious in any other island of the group, although there are cobras in the eastern chain of islands. The poison of some of the venomous species is extremely active, and, if fairly introduced into the circulation, ends in death. The Dahon-palay (rice-leaf snake) is universally dreaded by the natives. Under this name they include a number of distinct species of green snakes, most of which are absolutely harmless, although one at least is very deadly. The large poison glands give its head the typical arrow-shape so widespread among

venomous species, while its neck is very slender, and its body short, thick, and strong.

Two species of geckos are common in the houses. One is very small, and may be seen at any time running up the walls or, back downward, upon the ceiling. It feeds actively on mosquitoes, house flies, and other insect pests, works noiselessly, and may be regarded as an almost unmitigated blessing. The other species has a large, thick body, sometimes attaining a length of 8 inches. It is comparatively sluggish in its movements, and sometimes loses its footing when running on the ceilings, and falls. It has a loud call, which it is fond of giving, and it often interferes with one's slumber. Although ordinarily harmless enough these large geckos bite viciously at anything put near them, and are capable of inflicting disagreeable wounds.

There is an almost endless variety of lizards. Large iguanas are very abundant in many localities. They sometimes attain a length of more than 5 feet and are able to swallow fair-sized fowls whole. They are often seen in great numbers lying astride the limbs of trees and bushes along the river banks. When disturbed they drop into the water, usually disappearing and swimming away beneath the surface, but sometimes, when greatly frightened, swimming so actively that they seem to run on the top of the water. Their eggs are considered a great delicacy by the natives and are really very good, while the flesh of one species, variously known as *ibid*, *ibit*, and *pelubid*, is very highly esteemed. Flying lizards are very common in the forests, are often protectively colored, and are well-nigh invisible so long as they remain quiet on the gray trunks of the trees. They become suddenly conspicuous as they spread their flying membranes, which are often brightly colored, and sail from tree to tree, only to disappear again almost miraculously when they alight.

Crocodiles are extremely abundant in many of the streams and freshwater lakes, and are sometimes met with in the sea along the coast. They frequently attain very large size, measuring fully 18 feet in length. In certain parts of the Archipelago they occasion no little loss of life, while in other regions the natives may be seen bathing with apparent impunity in streams where they are known to abound.

Land turtles are common, but of small size and of no commercial importance. Sea turtles of large dimensions are frequently captured by fishermen in their weirs, and their flesh is highly appreciated. The tortoise producing the beautiful shell of commerce is abundant and a considerable amount of business is done in tortoise shell. Frogs in great variety occur, one small species appearing with the beginning of the rainy season, and even on some of the streets of Manila the noise of their outcry sometimes almost overpowers other sounds. In the forests there is a tree frog with enormously developed membranes between the

toes, which seem to aid in supporting it in its long leaps. Toads also occur, but are less common than frogs and there are fewer species.

Marine fishes constitute one of the chief sources of food supply in the Philippines, while some of the fresh-water species are also largely depended on by the natives. The number of species of fish in the waters of the Archipelago is doubtless much larger than that of any other group of vertebrates represented in the Islands, yet practically no scientific work has been done on them.

The method most extensively used for the taking of fish is the construction of pens or "corrals," which are to be seen in large numbers along the coasts wherever the water is shallow and the necessary food supply present. The sides of these pens are constructed of slender pieces of split bamboo, bound together with rattan in such a way that long pieces can readily be rolled up and transported from place to place. When it is desired to construct a corral at any given point, stakes are driven into the sea bottom, and the sliding is then unrolled and fastened to them. These corrals are sometimes so placed that they surround the favorite feeding ground and are immersed at high water. The fish then come in over the top at high tide, and the ebb leaves them imprisoned.

This method is varied at times and very large catches are sometimes made. The fish are sold fresh as far as practicable, but any that remain unsold are split and sun dried, and in this form find a ready market.

Another method in vogue at certain points, notably at Malabón, near Manila, is the suspending of very large dip nets from masts erected on boats or bamboo rafts by means of a contrivance not unlike the old-fashioned well sweep, so they can be quickly lowered and raised. Seining is practiced to some extent, but almost invariably in the shallow waters along the coast. In the Tañon Channel, and at other points in the Archipelago, deep-water traps are used, which are sometimes sunk in as much as 200 fathoms of water. They usually take the form of a loosely woven wicker or bamboo basket, and at one end there is an opening leading inward, protected by the usual pointed bamboos. The trap is baited with meat, and the fish having once entered can not readily escape.

In the very shallow waters along the beaches immense schools of small fishes are to be met with at certain seasons as they run in over the shoals in order to escape the attacks of the larger species or of full grown individuals of their own kind. The smallest of them, merely salted without drying or other treatment, are considered a great delicacy with the natives, who have several ingenious methods for their capture.

A species of mud fish, known to the natives throughout the Islands as *daalág*, is found throughout the rice fields during the rainy season, and at this time the natives may be seen wading in the fields, provided with basket-like traps, with sharply pointed bamboo surrounding the open end, which they continually thrust down into the water, on the chance of imprisoning the fish. The latter are so abundant that con-

siderable catches are made. The people declare that the daalág buries itself in the mud before the oncoming of the dry season; but as it is quite capable of working its way through the shallowest water or even over bare ground where the grass is damp, it is more reasonable to suppose that it finds its way into the paddy fields from the streams which are used to irrigate them, and departs again before they dry up.

It is needless to say that no measures looking to the propagation or preservation of valuable food fishes have been put into operation. At Malabón, however, the natives have hit upon the plan of capturing small fishes, which grow rapidly, and feeding them in artificial ponds until they reach a large size.

Among the marine forms there are a number of poisonous species, the eating of which sometimes occasions severe illness, and even death.

Sharks abound in the marine waters of the Archipelago, and the Indians engage in the dangerous task of capturing these voracious animals on account of the profit which they derive from the sale of their fins and tails, which constitute a gelatinous food, highly prized by the Chinese, who pay a high price for it. In the same waters are found the plow fish, or sut-sut, dogfish, rays, and hammer fish. The sea needle, so called from having the body very slender and long and of almost uniform diameter throughout, and the sea horse are found in these Islands. There are also many other orders and species, about which but little is thus far known, this leaf of natural history being as yet unread.

The Philippines are famous for the wonderful variety and abundance of their "land shells" which are with few exceptions formed by snails. They are of the most varied form, size, and color, and many of them are extremely beautiful. Many of them are protectively colored, and the nature of their shells is such that when the tree trunks that they frequent darkens with the wet, they darken at the same time. Many of the species are extremely local in their distribution, and the study of the land mollusca of the Archipelago is of absorbing interest to the conchologist. So far as known at present, none of the species are of great practical importance to man, although some of them are occasionally eaten by the natives. The fresh-water and marine forms are very numerous and many of them exquisitely beautiful. There are a number of species of edible oysters, clams, etc., which are used by the natives, and to some extent by Europeans also, as food. The shells of one species (*Placuna placenta* L.), which are like thin, flat plates, are cut into squares about 2 inches on a side, and quite generally used in place of windowglass. They are fitted into sliding wooden frames and when in place serve to modify the glare of the tropical sun, producing much the effect of ground glass.

The shells of the enormous giant clams of the genus *Tridacna* sometimes attain a length of 5 or 6 feet, and weigh hundreds of pounds. The valves are frequently used for baptismal fonts, etc., and the natives

sometimes burn them to make lime. Divers are afraid of them, and with reason, for they close with a grip like a vise, and were one of them to catch a man's foot he would certainly be drowned.

The true pearl oysters are found in the southern waters of the Archipelago, along the coasts of Paragua, Mindanao, and in the Joló Archipelago. They are particularly fine and abundant in the latter region, and very valuable pearls are frequently obtained there. It is stated that the pearl-shell fisheries rank, so far as quality of product and possibility of development is concerned, with the famous ancient grounds of Ceylon and the Persian Gulf. The pearls themselves, valuable as they are, are simply a by-product of the pearl-oyster shell, the mother-of-pearl of commerce being the principal object of the fisherman's quest. These shells weigh from 1 to 8 pounds per pair, some of them being as large as a dinner plate, and almost as round.

The conditions essential to the most perfect development of the mother-of-pearl-bearing mollusk are a reefy bottom near mud. In its surroundings there is often a luxurious supply of submarine vegetation, coral cups, and another beautiful coral growth resembling "coach whips" 4 or 5 feet in length. Sweeping tides and an abundance of living reefs are particularly favorable to the perfecting of this beautiful iridescent growth.

The shell is an important article of commerce, its value being dependent upon the quality of its hard, silvery iridescent or nacreous lining.

The varieties known to commerce are the white, the golden-edged, and the black-edged shells, the market value ranging from \$300 to \$900 per ton, according to quality and the source of production, and the Joló shells ranking the highest in the market.

There are probably no more expert divers in the world than the Moros who are engaged in pearl-shell fishing.

The wonderful chambered nautilus, or, as it is more commonly called, the pearly nautilus, is so common that its shells are much used by the natives for drinking cups. In the Tañon Channel it may readily be taken alive in deep-sea traps. A dozen or fifteen specimens are sometimes taken in a single trap in the course of a day. Very fine specimens of the delicate paper nautilus are also occasionally obtained.

The shells of certain of the marine mollusks serve a variety of purposes apart from that of making lime. Some of them, with hard and serrated edges, are used in harvesting rice. From the great opercula of others, bracelets and other ornaments are made. The cowries, formerly used in lieu of money in certain countries, have ceased to possess any commercial value. The *taclabo* (*tridacna*) shells are of enormous size, the largest in existence not seldom 5 feet long.

The *Arthropoda*, or animals with jointed feet, are represented in the Philippines by an enormous number of species, and have been as yet very little studied. Shrimps, crabs, and lobsters abound in the waters

of the Archipelago, and form an important part of the food supply of natives living along the coast or on the banks of fresh-water streams.

Spiders are found varying in size from the tiny, almost microscopic, creatures to great hairy tarantulas. The number of species of insects is so large that it would be folly to hazard a guess at it. Flies and mosquitoes abound in great numbers, and beetles are found in endless variety, as are butterflies and moths. There are three species of honey-making bees, and wasps of various species are abundant.

The number of species of ants is very large, and they occur in countless millions. A tiny red species frequently infests dwelling-houses and occasions great annoyance by swarming over the food. A much larger brown species has the same objectionable habit. Among the woodland forms there are many which bite or sting viciously, and some do both.

Finally we mention among injurious insects the termite (also called white ant), which inflicts great damage on wooden buildings, often causing serious loss. Some of the species raise hills 6 feet high, others build mud nests in the trees or bushes.

The remaining important groups of the animal kingdom may be briefly dismissed. Although they are all abundantly represented in the Philippines, they have as yet scarcely been studied, and a rich and almost unexplored field lies before the zoologist. The damp forests and warm seas swarm with life. Starfish and sea urchins are abundant. It is impossible to conceive of a more beautiful sight than that afforded by sailing over the wonderful coral beds of the southern islands and looking down through the clear waters at the wonderful display of beautiful form and color in the depths below.

## Chapter XI.

### NATIVE RACES.

[Revised by Dr. Albert Ernest Jenks.]

Contradictory statement about the native races—Area occupied by native tribes—Number of tribes—The Negrito—Malayan invasions—Igorot—Chinese mixtures—Mountain tribes—The people of Paragua—The seven Christian tribes—Languages and literature of the seven Christian tribes—Tagalo—Mohammedan Malay or Moro—Pirates of the China Sea—Habits and faith of the Moro—Three grand divisions, pagan, Christian, and Mohammedan—The Chinese question—The European mestizo—Work of The Ethnological Survey for the Philippine Islands.

The most diverse and contradictory statements are to be found concerning the inhabitants of the Philippine Islands. Some writers credit them with a high degree of civilization and compare them with our colonial ancestors or the patriots of '76, while other regard even the more highly civilized tribes as little better than barbarians. It is safe to say that the truth is to be found between these two extremes, and among a people of such diverse origin, culture, and faith it is unsafe to predicate any general statement.

The former rulers of the Archipelago have left but little authentic information concerning the wild tribes, for the Spanish explorations and conquests in the Philippines, conducted with the utmost vigor for the first few decades after the arrival of Legaspi, greatly lapsed at the end of fifty years, and, in some instances, the limits of missionary enterprise and political authority rested where the conquerors of the first half century left them. Thus all northern Luzón, except the narrow margin of the Ilocano coast and the slender strip along the Rio Grande de Cagayán which is occupied by the Christianized Ibanag, has continued to be held by a large number of wild tribes mostly of low Malayan culture; while the Islands of Mindoro and Paragua and nearly the whole of the great Island of Mindanao, with the Joló Archipelago, are still unexplored and only imperfectly subject to governmental authority.

In geographical extent these areas embrace hardly less than one-half of the entire Archipelago. The census of 1903 gives the number of the wild tribes as less than 700,000. Some enumerations have placed the number of distinct tribes as high as 70, but it is the opinion of



the chief of the Ethnological Survey for the Philippine Islands that this estimate is too high—probably there are not over 30 distinct tribes.

The ethnological map presents in 99 numbers as many groups of people. Many of these numbers, however, refer to one and the same group which occupies adjoining territory; others refer to people whose names are synonymous, often only known in written history.

The first 23 groups of the map, except probably Nos. 14 and 20, are Negrito, all to be considered within four or five tribes. Nos. 24 and 25, called Negrito, are Malayan. Nos. 26 to 41, inclusive, are styled Indonesian, but are to-day probably better classed as Malayan, as are also the remainder of the 99 groups.

While the vast bulk of the population is unquestionably of Malayan origin, the aboriginal race of the Archipelago is the dwarf, black people—the Negrito or little negro. These men are almost the smallest on the globe, and while suggestively negroid in their color and frizzly mops of hair, they have neither the small facial angle and large cranio-facial angle nor the long head of the African and Melanesian. They are true savages, depending for food upon the chase and wild roots, neither living in villages nor building stable huts, but roaming through the mountains in small groups of a few families each. They are simple, timid, and fearful, and yet to a certain extent are feared by the more civilized inhabitants of the Islands.

About 1250 Chao Yukua, a Chinese geographer, wrote of them:

They build their nests in the tree tops and in each nest lives a family, which only consists of from three to five persons. They travel about in the densest thickets of the forests and, without being seen themselves, shoot their arrows at the passer-by. For this reason they are much feared. If the trader throws them a small porcelain bowl they will stoop down to catch it and then run away with it, shouting joyfully.

The distribution of these Negritos has been studied by Meyer, but recent correspondence of and investigations by The Ethnological Survey for the Philippine Islands reveals their presence in several hitherto unrecorded regions. It has been invariably stated that their numbers are dwindling, and recent estimates have placed them as low as 10,000, but they are at least holding their own at the present time in most places, and no less than 30,000 have been accurately reported. There must be a good deal of vitality among this people who have resisted for centuries the attacks of Malayan, Chinese, and Spanish invaders of the Islands, and, while driven from the coast, they yet hold their own in the interior where conditions peculiarly suited to their manner of life obtain.

The number of problems presented to the ethnologist by these little blacks is almost bewildering. What place have they in the evolution of man? Their identity with the Sakais of the Malay Peninsula and the Mincopie of the Andaman Islands is almost certain; but what is their relation to those other pigmies—the long-headed dwarfs of Cen-

tral Africa? And further, what may be their connection with the true negro race of Melanesia, almost contiguous to them? The geographic distribution of the Negrito is such that it must be concluded that at one time they were practically the sole possessors of the Philippine Archipelago. Unquestionably the first newcomers to arrive to dispute their possession of the soil and to drive them into the mountainous interiors which they now occupy were the tribes of primitive Malaysians which still constitute the most considerable element of the population of the Islands.

The Negritos are fleet of foot and their usual weapons are a lance of bamboo, a palm-wood bow, and a quiver of poisoned arrows. Their principal food consists of fish, roots, fruit, and rice. They are notorious cattle thieves, swooping down upon the valley and driving the captured cattle to their mountain fastnesses. They have some knowledge of agriculture, but it is confined to scratching the soil with a stick and throwing in the seed, which is allowed to take care of itself.

They rarely spend more than a season in one locality, but move from place to place as inclination prompts or necessity compels. They use as ornaments bamboo combs, feather head dresses, rings and bracelets of brass or copper, and braided leg bands of hog bristles. It is their custom, also, to scarify the body, and such scars are their most highly valued adornment. Their household utensils are confined to a few cocoanut cups or seashells, and rude boxes in which they keep their simple belongings. Their trade consists in exchanging wax and other forest products for rice, tobacco, and small objects and trinkets with the inhabitants of neighboring places.

The celebrated Austrian professor, Ferdinand Blumentritt, who has devoted long, patient, and painstaking study to the literature of the ethnography of the Philippines, believes in three successive waves or invasions of Malaysians of low culture, and he attempts to fix approximately the periods of the migrations. Among such tribes are the great Igorot family of the mountains of northern Luzón, including the Dadayag, Kalinga, Ibelao, Ipúkaó, and numerous others bearing various local names.

The Igorot is a fine race of agricultural, head-hunting barbarians. They are copper colored, have high cheek bones, a flat nose, and thick lips. Their hair is straight, black, and in many areas is worn long.

The men have strong chests and well-developed muscles and possess great strength and power of endurance. The women have well-formed figures and as erect and graceful a carriage as any women in the Orient. Their dress varies from a mere apron of leaves to a handsome jacket and skirt with stripes of blue, crimson, and white. Tattooing is common among both men and women. With the men there are two chief motives in tattoo: First, the tattoo gives the man's war record. It tells whether he has taken a human head; second, it is æsthetic. The æsthetic is the governing motive for woman's tattoo.

In religion they have the crudest, simplest animism. This is universal among them. Out of it is found developing a form of the highest religion; the belief in a supreme being who is half man, half god, and who gives his people a crude code of ethics, and is the author of much of their constructive wisdom.

In many areas a "headman" has developed, and he is usually the richest man in the group—growing constantly richer because of his practice of getting a "rake-off" on his fellows' labors. But in some areas, as in Bontoc, no such "headman" or system of control exists; there each political division of the pueblos has a democratic council of old men, "wise men," which counsels and controls.

They commonly manufacture iron and steel bolos, spears, and battle-axes, also earthenware and a great variety of cloth of native cotton and of tree-bark fiber. Some of them also manufacture excellent salt from boiling springs, and some, in Benguet and Lepanto, mine gold and copper and have carried on the industry from prehistoric time.

Certain tribes, like the Ibelao, appear to be mixed Negrito-Malayan, but the oft-mentioned hypotheses of Chinese and Japanese admixture in certain tribes in northern Luzón is questioned. The most that can be affirmed at present is that the great mountainous mass of northern Luzón is occupied by numerous tribes of common Malayan origin, speaking different dialects. They are on a similar culture plane with the primitive Malayan tribes of much of the Malay Archipelago, such as the Dyaks of Borneo and the Battaks of Sumatra. They have the same practices of head-hunting, and some have been said to have ceremonial cannibalism, and everywhere the same community feuds exist. They all arose from common migratory movements and belong to a common, primitive, Malayan culture. The same element is represented in the central and southern islands of the Philippine Archipelago.

The mountains of nearly all the Visayas contain, besides roving bands of Negrito, communities of wild Malaysians. These people bear different names in different places: "Igorrotes" on Mount Isarog; "Buquidnon" in Panay; "Babylanes," "Pulijanes," and "Mundos" in Negros; elsewhere "Montescos" and "Remontados." The origin of these groups may be twofold. Some of them may be remnants of the primitive Malayan folk who were in the Archipelago previous to the arrival of the Filipino tribes now Christianized, and, as such, they should be grouped with the tribes of northern Luzón. But it probable that certain bands are made up simply of Filipinos who have fled to the mountains from the more ordered life of the plains. Outlawry or expulsion is the common form of punishment among all Filipino peoples, and to break with civilization is the habit of the man who has inflicted an injury or who has himself been wronged. In the history of Spanish administration entire towns have been depopulated through this practice. The outlaw—"filibustero," "tulisán," or "ladron"—is an ever-present type of Malayan society.

The primitive and exceedingly interesting tribes—the Tagbanua of Paragua and the Calamianes Islands and the Mangyan of Mindoro—would seem to be of Malayan and Negrito stock commingled. Many of the tribes of Mindanao are also probably referable to this early Malayan immigration, particularly those of the northern and western provinces. But in the vicinity of the Gulf of Dávao and Mount Apo, eastern Mindanao, there are found tribes whose character raises one of the most interesting problems in ethnology. Among these are the Ata and Tagabanua. The latter are reported to be very tall in stature, with hair wavy rather than straight, a narrow and prominent nose and a color of skin approaching that of the Polynesian. It is obvious that these are not the physical characteristics of the true Malay. If thorough investigation proves the existence of this type it must be concluded that there is another non-Malay element in the population of the Archipelago. Perhaps the first to call attention to the character of these tribes was Montaña, who, some twenty-five years ago, visited the coast of Dávao and ascended Mount Apo. Following the theory already developed by Hamy and other French writers, he calls these “Indoneasian.” The whole Indoneasian theory is ignored by Blumentritt and other German writers, but within the last few years it has received the warm assent of the English ethnologist, Mr. A. H. Keane. But Keane is certainly in error when he assigns to the Indoneasian element the Igorot and other tribes of northern Luzón. It is probable the Indoneasian theory will be exploded.

There still remain two of the most important divisions of the population of the Philippines. These are the seven large tribes of so-called Christians, which form, politically and socially, the “Filipino people,” and the Mohammedan Moro or Malays of the Joló Archipelago and Mindanao. The seven Christian tribes are the Visayan, occupying the central islands and the northern coast of Mindanao; the Bicol, of the southern extremity of Luzón; the Tagalo, of central Luzón; the Pampango and Pangasinán, of the central plain of the island; the Ilocano, of the northwest coast, and the Ibanag, of the valley of the Cagayán. These seven tribes almost certainly represent a Malayan migratory wave subsequent to that of the primitive Igorot and comparable tribes.

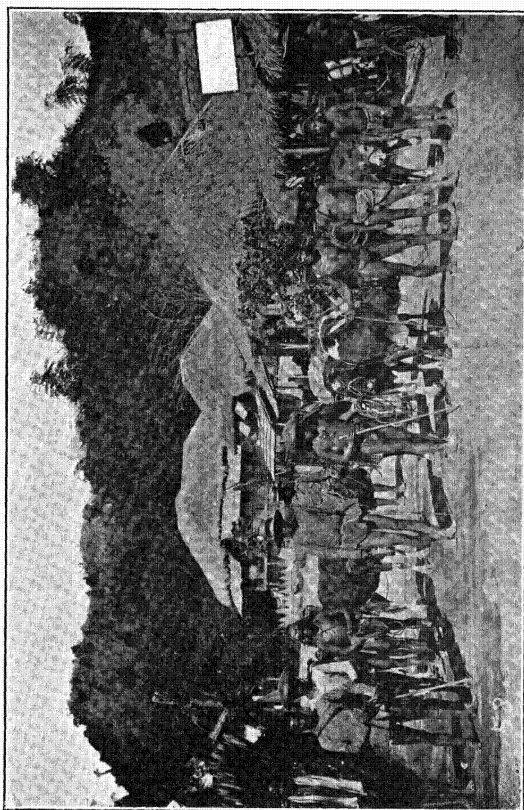
On the arrival of the Spaniards these seven tribes were already occupying the coastal plains and river valleys, having forced back into the interior the less-cultured tribes which had preceded them. The fact that they were of common origin did not stay the bloody hand of conquest, nor does there appear to have been a great intermixture between the two. The languages of these groups, while differing widely in their vocabularies, show a common Malayan origin and a uniform structural basis. At some time and place several of these tribes at least felt the contact of Hindu civilization, which, subsequent to the Christian era, flourished in Java and the Malay Peninsula, and built those wonderful temples that are yet to be seen in the tropical jungles.

From this source these Philippine emigrants acquired alphabets, the knowledge of writing, and many other arts of civilization, which elevated them far above the plane of the tribes of the interior. A Sanscrit element, especially in the Tagálo, as has been shown by Dr. Pardo de Tavera, exists in these languages. It is to these people that the mass of the civilized Filipino belongs.

The Tagálos are found at Manila, and the Provinces of Rizal, Cavite, Bataan, Bulacan, Batangas, Infanta, and Laguna, and in Mindoro, and in a less degree in the Provinces of Tayabas, Zambales, Nueva Écija, Isabela, and Principe. They have been in much more intimate contact with the Spaniards than the other tribes of the Archipelago. As before their migration they acquired from the Hindu, so from the Spaniard they acquired much of what civilization the Spaniard had to impart. While the educated Tagálo, Visayan, and Ilocano speak Spanish, each tribe retains its mother tongue, and in the Tagálo there is quite a literature, and newspapers are published in that language. In the exhibition of the Philippines at Madrid in 1887, Barranter showed twenty volumes of grammars and vocabularies of the Philippine dialects and 31 volumes of popular native poetry, besides two volumes of native plays. Spanish is not the language of the Archipelago, nor is there, indeed, any common medium of communication, and as none of the native languages have the aggressive vitality that is essential to a national tongue, and as Spanish is spoken, even after three centuries, by only a limited number, there are strong reasons for the systematic effort that is made at the present time to make English the speech that will finally unite the people on one common linguistic basis.

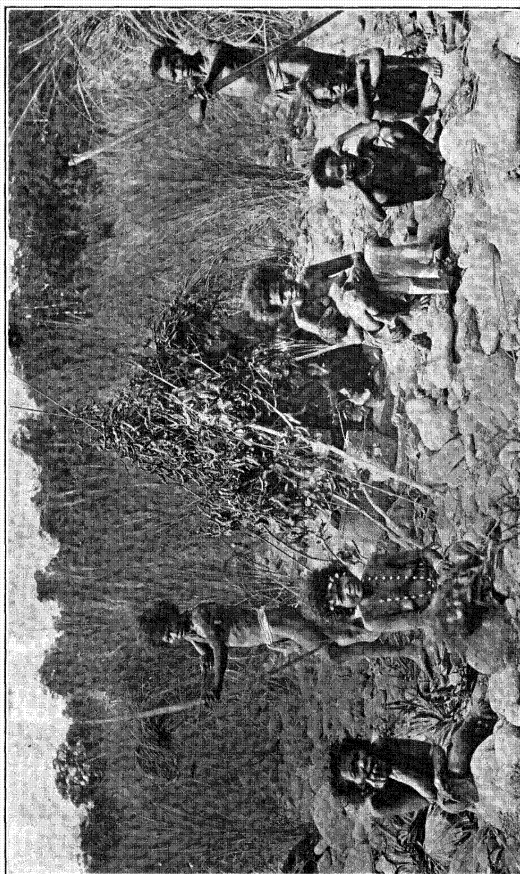
As the Tagalogs are the most numerous of the native peoples with whom the Americans have come into intimate contact, it may not be out of place to note somewhat in detail their more prominent racial characteristics. The Tagalog possesses self-respect, and in behavior is quiet and decorous. He treats others with Spanish politeness and expects the same treatment in return. When judged by laborers in the Tropics he may be said to be reasonably industrious and often, indeed, works hard.

The wife exerts a great influence in the family, and might almost be called the "head of the house." Children are welcomed, loved, and treated with forbearance, and there is a general desire manifested to give them an education. Parental authority continues during the life of the parent. Hospitality is a characteristic of the Tagalog (and in fact of all the natives of the Islands), as may be evidenced by any well-behaved traveler among them. They have mechanical aptitude, and among them are found engine fitters, turners, smiths, carpenters, boiler makers, etc. As early as the time of Legaspi he found cannon among them, and during the late insurrections, both against Spain and the United States, the insurgents made crude cannon for their forces, and



GORROTES IN BENQUET.

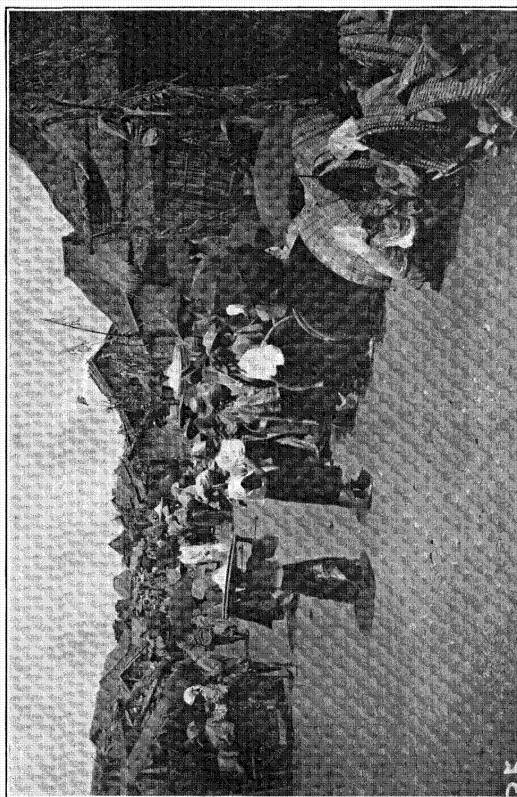
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AETAS IN DUMATAC, ISABELA PROVINCE.







MARKET, LIPA.

MARKET, LIPA.

4

were supplied in part with ammunition of their own manufacture. Many of the carriages in Manila are of native workmanship.

A writer who has an intimate acquaintance with the Tagalog says: "Perhaps the most remarkable talent possessed by this people is their fondness for music in its simpler forms. Each parish has its brass band supplied with European instruments. If the village be wealthy, there is usually a string band as well." When the American Army went to the Philippines the natives were quick to catch the music of the Army, and at religious services, in which a great deal of music is employed, Americans were, to say the least, surprised to hear such tunes as "Yankee Doodle" and "A Hot Time" breaking into the most solemn parts of the service. With their love for light music is a fondness for amusements—shows, theaters, horse races, cockfighting, and various forms of gambling possessing an irresistible attraction for them.

Of all the peoples preceding the Spanish in the Philippines, the latest comers are the Mohammedan Malay. The time of their arrival is easily fixed as subsequent to the thirteenth century, for the Mohammedan Malay, so prominent in the history of the eastern Archipelago as colonist, trader, and pirate, whose speech is the *lingua franca* of all Malaysia and the Indian Ocean, and who has given his name to and stands as the type for the entire race, was, previous to the twelfth century, only an obscure tribe of Sumatra. The conversion of this people to Mohammedanism by Arabian missionaries in the twelfth century appears to have given them the power and passion which has made them dominant everywhere south of the Visayan Islands in the Philippines. They were the "Norsemen" of the Orient, adventurous navigators and fierce fighters, and made their name a terror wherever their sharp prows cut the blue waters of the eastern seas. They arrived in the Joló Archipelago between 1300 and 1400 A. D. Upon the coming of the Spaniards in the sixteenth century their fleets of proas were filling the Mindoro Sea and sweeping the Straits of San Bernardino, while their outposts and settlements reached to Manila Bay. The Spaniard checked their further progress in the Philippines, though he utterly failed, after centuries of conflict, to reduce them to Christianity or obedience to the Spanish Crown. Their history is the climax of Malay piratical power, and the scourge of the Maguindanao (ancient name of the Island of Mindanao) sea rover was felt for centuries for a thousand miles both north and south of their strongholds in Joló and Lanao.

The Moros are well developed physically, but are of medium height; their complexion is dark, and they have abundant straight black hair. Their small, black, animated eyes, set close together, are not calculated to inspire confidence. The Island of Joló has always been the political, religious, and commercial center of all the Philippine Moros, even for those found in Mindanao and Paragua. The original Malay type of

these insular Mohammedans or Moros, as the Spaniard called them, has been modified by two distinct and opposite foreign elements, namely, the natives of the Philippines and the Arab. Until recently the natives of the Joló Archipelago practiced continual piracy along the Philippine coasts, and had they kept the slaves captured during these forays the population of Joló would to-day be formed in a great measure of a mixture of Philippine people, but the pirates sold the greater part of their captives to other coreligionists who dwelt on other islands, and thus kept the blood, in a measure, pure. The Arabic element has modified the Joló type in a smaller degree. The natives of that race being in insignificant numbers, would have left no trace of their presence had it not been that most of them occupied the highest places, which were the only ones among them making polygamy possible. The individuals who show the Arabic characteristics more or less plainly are not uncommon, and some even reproduce the original type with fidelity. It is thus seen that the people of the Philippines naturally divide themselves into three grand divisions, all of them of Malay extraction, with the exception of the aboriginal Negrito, yet widely separated as to language, habits, culture, and faith. First, the non-Christian tribes of the interior upon whom the Christian faith and Spanish civilization have made but little impression; second, the Christianized tribes who accepted Spanish rule, adopted Spanish civilization, in part at least, and were converted to the Christian faith; third, the Mohammedan Moro over whom the Spaniard never exercised more than a nominal sovereignty, and whose faith and culture remain practically unmodified by any European influence.

There is another element that can not be overlooked in any description of the people of the Philippines. Even before Spanish domination began the Chinese had commercial relations with the Philippines. When Legaspi founded Manila in 1571 the Chinese were granted personal security when they landed, though it was necessary to administer severe punishment to the ungovernable crowds who frequently killed and robbed them.

After the Spanish power became thoroughly established the number of Chinese residents in the Philippines continued to increase and it became necessary to segregate them from the remainder of the population. By the middle of the seventeenth century there were some 30,000 Chinese in the neighborhood of Manila alone, and many others were scattered throughout the Archipelago. Soon after this time the Chinese rose against the Spaniards, but were defeated with much slaughter after a severe struggle, and then greater restrictions were imposed upon Chinese immigration. The Chinese question has always been the preëminent question with the Governors-General, and when Señor Norzagaray surrendered his command in 1859 he wrote an extensive paper on the subject in which he stated that it would be better for Spain to become impov-

erished by taking energetic measures against these Asiatics than that the Philippines should be ruined by becoming overrun with Chinese.

Since the administration of Señor Norzagaray up to the beginning of the war between the United States and Spain the influence of the Chinese in the Philippines continued to increase both in commerce and in the industrial arts.

According to the census of 1876 there were 30,797 Chinese in the Archipelago, and in ten years, or in 1886, this number had grown to 99,152, scattered throughout the principal islands of the group. Since nearly all the Chinese who migrated to the Philippines have been males they have to a certain extent intermarried with the inhabitants of the Islands, and while perhaps this admixture would not have been sufficient to modify the race type, yet the Malays themselves, whose original home was near the great hive of Chinese population, were mixed to a certain extent with Chinese blood, and it is easy to see in the prevailing type in the more civilized parts of the Archipelago evidence of Chinese blood, some of which may have descended from remote times.

Finally, to the classes already mentioned, there must be added another, that of the European mestizo, which in number and area occupied has gone on increasing since the beginning of Spanish domination. This class is to be found in all regions which have been reached by the commerce of Europe, but it is particularly numerous, as may be readily understood, at the capital and in its immediate vicinity, as well as in the various provincial capitals and more important towns. Of such diverse and varied elements, then, is the population of the Philippines composed. The variety of problems they present is equally great for the ethnologist and the statesman; and nowhere, it may be asserted, must the constructive work of administration be so dependent for information and guidance upon the research of the expert student of ethnology.

Since the first arrival of the Portuguese in Eastern waters the mind of the Malay has appeared to the European as a closed book. Both races have ever mistrusted and misunderstood each other. Out of mutual ignorance and fear have followed hatred, oppression, and retaliation. In the establishment of order in the Philippines the Insular Government is attempting to rear a new standard of relationship between the white man and the Malay. The success of this effort, so full of possibilities for the future of life and intercourse in the Far East, will depend in a large measure on the correct understanding and scientific grasp of the peoples recently committed to our care. Science can have no nobler mission than to discover and direct the good inherent qualities in every people, nor can a more practical work engage the attention of the Government than the promotion of a better understanding between the races.

## Chapter XII.

### HISTORY.

Discovery—Magellan—Early expeditions to the Philippines—Miguel Lopez Legaspi—Juan de Salcedo—The pirate Li-Ma-Hong—Attack on Manila—Arrival of Franciscan monks—Conflicts with the Dutch—Chinese pirate Koseng—Struggle with the English—Lack of nationality—Policy of Philip III—Establishment of industries—Coastwise steamers—Banks established—Historical chronology.

The progressive Kingdom of Ferdinand and Isabella was quick to seize the advantages which accrued to her by the discoveries of the bold Genoese navigator, and twenty-seven years after Columbus had planted the banner of Spain upon the little islands of San Salvador, Hernando Magellan's flotilla sailed from Seville on a voyage of discovery.

Two years later, in 1521, the same year that witnessed Cortés fighting his way from the coast to the valley of Mexico in his marvelous campaign against Montezuma, Magellan landed at Butuan, on the north coast of Mindanao, raised a cross on a small hill and celebrated mass for the first time in the Philippines, and the intrepid explorer took possession of the land in the name of the King of Spain.

Notwithstanding the fact that it is almost four hundred years since the flag of Spain first floated on the tropical breezes of Philippine territory, and its metes and bounds have been traced upon the maps of the world, the Archipelago is practically a new country. Hernando Magellan, sailing for months through uncharted seas, doubled the American continent, passed through the strait that bears his name, entered upon what to him must have seemed an illimitable ocean, and finally landed upon islands which even yet have not been surveyed nor explored, a demonstration of the fact that discovery is easier than development. Magellan afterwards went from Mindanao to Cebú, and made an alliance with Hamabar, the King, but was killed in battle on the small island of Mactan, having joined with the latter in a war with the people of this island.

Duarte de Barbosa and twenty-six companions were treacherously assassinated at a banquet by order of Hamabar, and in 1522 the remnant of the expedition reached Seville, under the command of Don Juan Sebastian de Elcano, thus completing the first circumnavigation of the globe.

During the next quarter of a century, between 1525 and 1550, three expeditions sailed for the Philippines, the first under the direction of Fray García José Loaisa, which passed through the Strait of Magellan, where a violent storm scattered his vessels, and Loaisa died while on the Pacific. Capitana, a member of the expedition, reached Mindanao, and, upon attempting to reach Cebú, was driven by tempests to the Moluccas.

Two years later an expedition from Mexico under the leadership of Alvaro de Saavedra set out for the Orient, and in 1528 reached Mindanao, where stores were replenished and then, like the former expedition, proceeded to Moluccas. In 1542 the third expedition, under the command of Ruy Lopez de Villalobos, sailed from the port of Natividad, in Mexico, and reached southern Mindanao, and the commander gave to the Island of Leyte and adjacent islands the name "Filipinas," in honor of Philip, at that time crown prince of Spain, which name was afterwards extended to the entire Archipelago. A number of causes combined to compel Villalobos also to touch at the Moluccas, against both his own wishes and those of his King.

The remnants of this expedition, seven years after setting out, reached Spain. Thus from 1519, the date when Magellan sailed from Seville, until 1564, a period of forty-five years, four separate attempts were made to secure a foothold in the Philippines, but without results. Those trials had been expensive in both life and treasure without tangible results save that of widening the world's geographical knowledge.

The next effort to make a lodgment on the Islands was intrusted to General Miguel Lopez de Legaspi, who took with him Friar Andrés de Urdaneta, who had been a member of a former expedition and had meanwhile taken the vows and habit of an Augustine monk. The entire force consisted of four ships and one armed frigate, carrying 400 soldiers and sailors. The flotilla visited the Islands of Leyte, Camiguing, Bohol, and Mindanao, and finally cast anchor in the port of Cebú in 1565, which place it was decided to capture.

The natives resisted, but the town was taken and sacked, and the long struggle not yet concluded between the natives and the oversea foreigners began. Legaspi pushed forward his conquests little by little, and seems to have been both resourceful and strong. He gradually won the confidence of the natives, their deposed King accepted baptism at the hands of the monks, and his daughter married a Spaniard. About this time Friar Urdaneta returned to Spain to report to King Philip II.

In 1568 two galleons arrived at Cebú with troops, munitions, and arms, and with them was Juan de Salcedo, a grandson of Legaspi, called the Hernan Cortés of the Philippines. About this time the Portuguese sent an expedition to dispute possession of the territory and Legaspi built a fortress, allotted portions of land for Spanish residents, and in 1569 Cebú was declared a city and Legaspi was made governor-general of all the lands he could conquer. In 1571 Legaspi transferred his government



to Manila and declared it to be the capital of the Philippine Islands and proclaimed the sovereignty of Spain over the entire Archipelago. Manila was already at that early period a place of considerable size. It was divided into two districts, that of Manila proper and that of Tondo. These two districts were governed by two princes, bearing the Malay title of *rajah*. One of these was *Rajah Lacandola*, whose rule extended over Tondo. The descendants of this man are still known as the *Lacandola* family, and reside in the central part of Luzon. It is interesting to know that down to the time of the Spanish-American war the members of this family, as being of blood royal, were exempted by the Spanish Government from the payment of all taxes, duties or contributions whatever.

Legaspi died in 1572, leaving a name in Spanish history that will ever shed luster upon his native land. He was one of the foremost of the intrepid explorers and conquerors that made the sixteenth century so remarkable.

Meantime Salcedo was extending his conquests and soon Zambales, Pangasinán, Ilocos, and Camarines acknowledged Spanish supremacy.

Guido de Lavezares was appointed to succeed Legaspi by sealed instructions from the supreme court of Mexico. During the successful administration of his predecessor commercial relations had been established with the Chinese, who looked with longing eyes upon those fertile lands. In 1574 the Chinese pirate *Li-Ma-Hong* attempted to capture Manila. His depredations on the Eastern seas, like those of the buccaneers along the Spanish main, made his name a terror. He had been outlawed by the Chinese Emperor, and he therefore gathered together a fleet of 62 armed junks, and carrying 4,000 soldiers and sailors with some 1,500 women set forth to capture and establish a new kingdom.

On arriving at the Bay of Manila in November, 1574, a desperate attack was made, but the pirate failed in his attempt to capture the city, and with a remnant of his force retreated north and attempted to establish himself in Pangasinán, but was soon dislodged by a combined force of Spanish and natives, the latter having set forth on a punitive expedition against *Li-Ma-Hong*. A considerable number of *Li-Ma-Hong's* forces scattered among the mountains, and intermarried among the *Igorrote* tribes. Their descendants may to this day be distinguished by their semi-Chinese features. This victory is still celebrated in the Philippines as a public holiday.

The more important events which occurred during the remaining years of the sixteenth century were the arrival of the first Franciscan monks in 1577, and the following year Francisco de Sande, the governor-general, undertook an expedition to Borneo, where he restored its legitimate King to the throne, who later offered vassalage to Spain, and both *Joló* and *Mindanao* were subject to his rule. The Chinese, of whom there was no little fear among the few Spaniards, were compelled to live under

the guns of Fort Baybay. The first bishop, Fray Domingo Salazar, arrived at Manila, together with the first party of Jesuit fathers, and the foundations of the Manila cathedral were laid. In 1583 during the funeral ceremonies of Gonzalo Ronquillo the church of San Augustin took fire and two-thirds of the city was destroyed.

In 1584 the royal audiencia of the Philippines was established; in 1590 the walls of Manila were built, and diplomatic relations were established with Japan.

At no time has the history of the Philippines been commonplace. Struggles between the military and civil authority, between the church and state, and expeditions against the natives, fill the chronicles of the years. Early in the seventeenth century began a number of naval engagements between the Spaniards and the Dutch extending over a period of more than fifty years. The latter did not attempt to take possession of the Philippines, but contented themselves with sea fighting and plundering vessels which brought supplies to the Spanish colonists. The honors were about evenly divided, with the balance, on the whole, rather in favor of the Spaniards; the most notable engagement being that of Playa Honda, in which the Dutch were completely vanquished after a struggle lasting six hours. They lost three ships, their flags and artillery, and merchandise to the value of \$300,000. In July, 1620, three Mexican galleons met three Dutch vessels off the Cape Espiritu Santo, but managed to escape in the dark. Two of the galleons were beached and the third reached Manila. After this the Government vessels were instructed to vary their course on each voyage so that the enemy could not tell where to lie in wait for them.

In 1662 another Chinese pirate, Kotinga, demanded the submission of the Archipelago. He had captured Formosa, then under control of the Dutch, and had gathered a very large force about him. His demand for submission was refused and the Filipino Spaniards proposed to resist. Bodies of infantry and a squadron of cavalry were organized, and the churches, convents, and houses outside the walls were razed to the ground.

Kotinga, in order to communicate with the Spaniards, elevated an Italian Dominican missionary named Vitorio Riccio to the rank of mandarin and sent him as ambassador to the governor of the Philippines. The position of this European friar as ambassador of a Mongol pirate was certainly a trying one, though he was received with every mark of respect.

The opinion gained great credence that the Chinese in Manila were parties to the plans of Kotinga, and when a Spaniard was killed in the market, the guns of the fort were trained on the Parian. Many Chinese were killed, others hanged themselves, and some escaped by sea. A general massacre followed, but was finally checked in view of the incon-

venience that would have followed from the lack of tradesmen and mechanics.

The next conflict was with the English. In 1762 Spain agreed to unite her forces with those of France against England, and in the war which followed the latter country sent fleets over sea to harass and capture Spanish outposts. The British were everywhere successful. In the West Indies Havana was captured by Rodney and Monckton, and a flotilla of 13 vessels appeared before Manila under command of Admiral Cornish. The surrender of the city was demanded, but the Spaniards refused and prepared to make a desperate defense. Brigadier-General Draper thereupon disembarked his troops and again demanded the surrender of the citadel.

The acting governor-general, the Archbishop Manuel Antonio Rojo, was inclined to yield, but a war party under the leadership of Simon de Anda y Salazar determined to resist to the uttermost. There were excesses committed on both sides, and for some time the palm of victory hung in the balance, but the English were finally victorious and entered the city October 5, and their flag floated over the Walled City. A heavy contribution was levied upon the inhabitants, which, however, with the silver from the pious establishments, church ornaments, plate, etc., amounted to but \$546,000, and the further sum agreed upon was never paid. By the peace of Paris, February 10, 1763, the Philippines were restored to Spain and the British retired, leaving the war-wrecked Archipelago in possession of the Spaniards. The jealousy and open attacks of the Portugese, Chinese, Dutch, and English, serious as they were, formed but a part indeed of Spain's military problem in the Philippines. When Spanish sovereignty was proclaimed over the entire Archipelago it was for the purpose of announcing to the world to keep hands off, rather than a statement of an accomplished fact. Spanish sovereignty was at first limited by the range of old matchlocks. There was no community of interests between the different tribes. They had no common language, no common head, no confederacy.

The Spaniards did not have to divide in order to conquer. The people were already divided, and the Spanish sphere of influence was gradually increasing by attacking one tribe after another and conquering each district separately.

For the purposes of conquest this was an advantage, but it opposed almost insuperable obstacles to the task of unifying the people after they became subject to Spain. For three centuries or more the Spanish rulers attempted to cultivate a feeling of nationality that was foreign to the native mind. The different tribes hated or mistrusted each other and desired nothing save their own savage independence.

They have been to a great extent isolated throughout the centuries by barriers of mountains or swift channels, and the task before the present

Government is to weld these elements by means of highways, railways, a school system common to all and open to all and allow time to perform its work under these new conditions.

The checkered history of the Philippines and the constant demands made upon the royal treasury for their maintenance and defense naturally raised the question of their retention or abandonment. It was urged that they could never be altered for the better, that the vast quantities of silver sent there from other Spanish possessions were absorbed by the Chinese, that the Islands were so separated by dangerous seas that they could never be welded into one compact body politic, and therefore it would be better to let them go and work out their own salvation or destruction, as the case might be.

According to Argensola, a learned churchman of the period when the transition was effected from the policy of Philip II to that of Philip III, the latter was influenced by religious rather than worldly interest. There were mission fields where the cross rather than the sword was to win victories. It is recorded that Philip III replied to the anti-expansionists:

For what would the enemies of Christ say if they perceived that the Philippine Islands were left destitute of the true light, and its ministers to propagate it, because they did not produce rich metals and other wealth, like the rest of the fruitful islands in Asia and America?

The religious orders of St. Augustine, St. Dominic, San Francisco, and the Jesuits continued to send recruits, who established missions, built churches and convents, and baptized pagans, gradually pushing farther into the interior the border line between barbarism and civilization.

After the English retired from Manila, the government was given a second time to Simon de Anda y Salazar and he began at once to repair the ravages caused by war. He established the chamber of commerce and developed the natural wealth of the country. He was succeeded in 1778 by José Basco y Vargas, whose rule marked an era of notable progress. He encouraged agriculture and the mechanical arts, offering premiums to those who produced the best implements, to those who erected silk factories, cotton factories, and of everything that was imported from foreign countries. He improved the defenses of Manila and aided in the organization of the Philippine Company, whose object was to promote commerce on a large scale. He planted tobacco in Luzón, he regulated taxes, and freed the Islands from highway robbers. The government of the Islands during the first quarter of the nineteenth century was committed to Mariano Fernández de Folgueras (1806), Manuel González Aguilar (1810), and José Gardoqui de Garaveitia (1813). Measures were taken to curb the piratical excursions of the Moros of the south, who had the courage to enter the Bay of Manila

and take some of the inhabitants as prisoners. There were difficulties with the natives at Ilocos, who resented the payment of taxes, but peace was restored without serious difficulty.

In 1823 a military revolt headed by Novales was put down, and in 1827 some of the towns of Cebú and Bohol started a rebellion, but Ricafort sent against them Lazaro Cano, judge of Cebú, who succeeded in reducing the turbulent towns to obedience. Pascual Enrile (1830) devoted himself to building roads and establishing means of communication in the islands of the Archipelago. He organized the postal service, protected the interests of the royal treasury, and raised the taxes on tobacco.

During the twenty-five years between 1837 and 1862 the Philippines were governed by men eminent both as soldiers and as executives. The offices of the government were organized with system and order and the piracy of the Moros of the southern waters about Joló was terminated.

During this period the first coastwise trading steamers began to ply the waters of the Philippines and all the islands and cities of the Archipelago were put into direct communication with the metropolis. Most of the provinces were visited by the governors, highway robbery was severely punished, agriculture was stimulated, a wider market was secured for insular products, and a beginning was made toward the establishment of institutions dedicated to elementary and higher education. The Banco Español-Filipino was founded and a number of business houses grew up to be strong firms, importing and exporting merchandise, thus putting the Islands more and more in touch with the world. Public works of importance and magnitude were undertaken, others were improved, and much was done toward putting the Islands in touch with the spirit of the nineteenth century.

It is impossible within the limits of a single chapter even to outline the history of nearly four hundred years, therefore there is added to this a chronological table giving the list of the more important events from the date of discovery to the present time, and for details the reader is referred to the numerous histories of the Philippines that have been published.

#### HISTORICAL CHRONOLOGY.

- 1519. Magellan's flotilla sails from Seville.
- 1520. Magellan passes the strait which is named for him.
- 1521. Magellan lands at Butuan, in the north of Mindanao; raises the cross and celebrates mass for the first time in the Philippine Islands. Magellan takes possession of the Islands in the name of the King of Spain. Alliance between Hamabar, the King of Cebú, and Magellan. Death of the latter on the Island of Mactán. Duarte de Barbosa and twenty-six companions are assassinated at a banquet by order of Hamabar.
- 1522. Remnants of the expedition reach Seville in the ship *Victoria*, commanded by Don Juan Sebastian del Cano, thus completing the first circumnavigation of the globe.

## EXPEDITIONS OF LOAISA, SAAVEDRA, AND VILLALOBOS.

- 1525. The expedition of Fray Garcia José Loaisa sails from Coruña.
- 1526. Loaisa passes the Strait of Magellan, where a violent hurricane scatters part of his ships. Loaisa and Sebastian del Cano die on the Pacific. Capitana goes to Mindanao, and, upon attempting to reach Cebú is driven by tempests to the Moluccas.
- 1527. Expedition from Mexico under the leadership of Alvaro de Saavedra.
- 1528. Saavedra arrives at Mindanao, and then goes to the Moluccas.
- 1542. The armada of Ruy López de Villalobos sails from the port of Juan Gallego, in Mexico.
- 1543. Villalobos reaches southern Mindanao. He gives the Island of Leyte the name "Filipinas," which is afterwards extended to the entire Archipelago.
- 1549. The remnants of the expedition of Villalobos reach Spain.

## DON MIGUEL LÓPEZ DE LEGASPI.

- 1564. The armada of Legaspi raises anchor at Natividad, in Mexico. Fr. Andrés de Urdaneta and other Augustin monks join the expedition.
- 1565. The Islands of Leyte, Camiguin, Bohol, and Mindanao are visited and the flotilla then anchors at Cebú. Distrust and hostility of those islanders. The submission of the inhabitants of the island.
- 1567. Legaspi sends his tender to Mexico under command of Juan de la Isla.
- 1568. Two galleons arrive at Cebú with troops, munitions, and arms, and with them comes Don Juan de Salcedo, called the Hernan Cortés of the Philippines. Portuguese squadron, under command of Gonzalo Pereira, anchors off Cebú. The purposes of the latter are frustrated by the wise firmness of Legaspi.
- 1569. Legaspi transfers his encampment to Panay. Three vessels, commanded by Juan de la Isla, arrive with dispatches from the King, conferring on Legaspi the governorship of the Islands and the title of Adelantado.
- 1570. An expedition under the orders of Don Martin de Goiti and Don Juan de Salcedo sets forth from Panay in order to study the conditions about Manila. Favorable reception of the Spaniards by Rajah Lacandola and Rajah Soliman. Treachery of the latter and his destruction. Return of the Manila expedition to Panay.
- 1571. Legaspi takes possession of Manila. Subjugation of certain provinces of Luzón by Don Martín de Goiti and Don Juan de Salcedo. Legaspi establishes commercial relations with the Chinese. Arrival of two ships with reinforcements at Cebú.
- 1572. Subjugation of new provinces by Salcedo. Death of Legaspi.

## DON GUIDO DE LAVEZARES.

- 1572. Complete submission of Zambales, Pangasinán, and Ilocos to Goiti.
- 1573. Submission of Camarines to Salcedo.
- 1574. Attack of the Chinese pirate Li-Ma-Hong on Manila. Heroic defense. Opportune arrival of Salcedo and defeat of Li-Ma-Hong.
- 1575. Salcedo attacks Li-Ma-Hong at Lingayén. Shameful flight of Li-Ma-Hong.

## DON FRANCISCO DE SANDE.

- 1576. Early death of Salcedo.
- 1577. Arrival of the first expedition of Franciscan monks.
- 1578. Fortunate expedition of Sande to Borneo. He restores its legitimate king to the throne and the latter offers vassalage to Spain. Joló and Mindanao tributaries (to him).

## DON GONZALO RONQUILLO.

- 1580. The Chinese are compelled to live together under the cannon of Fort Baybay.
- 1581. Arrival at Manila of its first bishop, Fr. Domingo Salazar. With him comes the first party of Jesuits. Beginning of work upon the cathedral. Second expedition to Borneo to restore the King to his throne.
- 1582. Victory won by Don Pablo Carrión in Cagayán over the Japanese corsair *Taifusa*. Expedition to Ternate under command of Lorenzo de Cartagena. Sickness decimates the troops.
- 1583. Death of Ronquillo. During his funeral ceremonies the Church of San Augustin burned, and, the fire spreading to the citadel, two-thirds of Manila were destroyed.

## DON DIEGO RONQUILLO.

The building up of Manila. Charity of the governor in aiding the needy. Pacification of certain towns which had revolted because of the excesses of the military commander.

## DON SANTIAGO DE VERA.

- 1584. Establishment of the royal audiencia of the Philippines. The governor, under ample authority from the King, checks the abuses of military leaders. Construction of a stone fortress.
- 1585. Unfortunate expedition to Ternate. A conspiracy provoked by thievish Moros is discovered among the natives of Pampanga and Manila. Changes in Cagayán and Ilocos. Capture of the ship *Santa Ana* by the English corsair, Thomas Cavendish.
- 1587. Arrival of the first expedition of Dominican monks. Establishment of an artillery foundry. Foundation of a hospital for Spaniards.

## DON GÓMEZ PÉREZ DASMARINAS.

- 1590. Construction of the walls of Manila and of Fort Santiago. Reorganization of the armada.
- 1590. Suppression of the royal audiencia by royal decree. Establishment of the College of Santa Potenciana for the orphans of military men.
- 1591. The arrival at Manila of Faranda, the ambassador of Taicosama, the Emperor of Japan, demanding surrender of the Islands.
- 1592. Dasmarinas sends as ambassadors to the Emperor of Japan the Dominican Father Cobo and Capt. Lope de Llanos.
- 1593. New embassy to Japan. Coming of the King of Siao to Manila in order to offer obedience to King Philip II. Strong expedition to the Moluccas, under command of Dasmarinas, to help the King of Siao. Dasmarinas is assassinated by Chinese oarsmen at Point Santiago.

## DON LUIS PÉREZ DASMARINAS.

- 1593. Suspicions aroused by large number of Chinese junks which arrive at Manila.
- 1594. An embassy sent to China to obtain the giving up of the assassins of Don Gómez Pérez Dasmarinas without result. Foundation of the Obra Pia de la Misericordia.
- 1595. Daring expedition of the governor to Nueva Vizcaya, Isabela, and Cagayán, which results in the subjugation of those regions.

## DON ANTONIA DE MORGÁ.

1595. By virtue of a royal cedula each religious order has assigned to it the provinces in which it may exercise administration over spiritual affairs.
1596. Expedition to Mindanao under the command of Capt. Rodríguez de Figueroa. This officer ascends the Rio Grande. At Buhayen a Moro treacherously kills him.

## DON FRANCISCO TELLO DE GUZMAN.

1597. Don Juan Ronquillo goes to Mindanao to take the place of Figueroa. He destroys the fleet of Moro boats from Ternate which came to the help of the Moros in Mindanao, and as a result of this victory the Moros of Mindanao and Joló become vassals of Spain. Ronquillo abandons the acquired territory. News is received at Manila that the ship *San Felipe* has been driven to Japan; that Taicosama has perfidiously taken possession of the rich cargo which she carried, and that a number of monks had suffered martyrdom at Nagasaki.
1598. Reestablishment of the royal audiencia. Contrary to the opinion of the audiencia, Tello orders the evacuation of the fort of La Caldera in Mindanao.
1599. A powerful fleet of Moro pirates infests the coast of Cebú, Negros, and Panay, causing great loss of life and property.
1600. A great naval victory off Mariveles over the Dutch corsair, Olivier van Noort. A fleet of Moro pirates attacks the town of Arevalo, in Iloilo, and is defeated. Earthquake at Manila.
1601. Foundation of the College of San José, under the direction of the Jesuits.
1602. Expedition to Joló under command of Gallinato. After having accomplished something it returned for lack of supplies.

## DON PEDRO BRAVO DE ACUNA.

1602. Commercial relations are established with Daifusama, Emperor of Japan.
1603. A tremendous conflagration destroys a third part of Manila. Uprising of 20,000 Chinese. Spaniards, natives, and Japanese unite and completely overcome the Chinese.
1606. Fortunate expedition to the Moluccas. The record of Bravo de Acuna against the Dutch. Uprising of the Japanese. They are conquered and are prohibited from living in future together in one ward. The Dutch corsair, *Blancardo*, is defeated and captured by Don Pedro de Heredia.

## DON JUAN DE SILVA.

1609. This governor begins by very actively improving the fortifications, casting heavy guns, and constructing vessels. The Dutchman, F. Wittert, orders a landing at Oton (Panay), but Don Fernando de Ayala falls unexpectedly upon the Dutch, who had disembarked, and destroys them.
1610. F. Wittert takes up a position off Mariveles, and makes prizes of various Chinese and Japanese vessels. Defeat and death of Wittert at Mariveles brought about by a Spanish squadron under command of Don Juan de Silva.
1614. Japanese driven from their country on account of professing the Catholic faith received with great warmth in Manila.
1615. Ruy Gonzales de Segueira arrives at Manila with reinforcements, coming by way of the Cape of Good Hope.



1616. Don Juan de Silva sails at the head of a powerful armada against the Dutch. The little squadron of the Viceroy of India is burned by the Portuguese before it falls into the hands of the Dutch. The latter avoid the attack of the Spanish armada.
1616. The Dutch Admiral Spielberg bombards Iloilo. He disembarks and is defeated by Diego Quiñones. A little fleet of twenty-four canoes, manned by Moros, allies of the Dutch, is destroyed by Flores in Punta Pitol.
1617. A naval combat takes place at Playa Honda, in which Spielberg is completely defeated by Don Juan Ronquillo.

SECOND PERIOD—FROM THE NAVAL COMBAT OF PLAYA HONDA (1617) TO THE DISMISSAL OF GOVERNOR ZABÁLBURU (1709).

1617. A little fleet is stationed at Iloilo to intercept the Moro piratical expedition.

DON ALONZO FAJARO.

1618. He lessens the personal services required of the natives. By careful instruction to the ships from Acapulco he enables them to avoid falling into the hands of the Dutch.
1619. Inauguration of the College of Santo Tomás.
1620. Combat in San Bernardino Straits between three Spanish and three Dutch vessels. Father Moraga, who had obtained from Philip III promises not to abandon the Philippines, as some of his advisers counseled him, perishes in a shipwreck.
1624. Victory won by Don Geronimo de Silva over seven Dutch vessels off Corregidor. Instead of pursuing his scattered enemy he orders his fleet to return to Cavite, on account of which he is proceeded against and shut up in Fort Santiago.

DON FERNANDO DE SILVA (PRO TEMPORE).

1625. Don Fernando accepts acquittal at the hands of his predecessor, and is put at liberty. Piratical expeditions from Borneo infest the coasts of Sámara and other islands, doing great harm.
1626. Expedition to Formosa. Tanchuy is occupied.

DON JUAN NIÑO DE TAVERA.

1627. A strong armada sets forth under the orders of the governor for Formosa. Bad weather compels it to return to Manila, but the ship *Rosario* arrives at Tanchuy. The Dutch attack this port and are defeated.
1628. Plague at Manila. Expedition under command of Olaso against Joló with little results.
1629. Great conflagration at Cavite.
1630. More fortunate expedition of Don Pedro Tonsino, commander of Dapitan, against Joló. Arrival of the ambassadors of Comboja, offering free trade and a shipyard for the construction of vessels.
1631. The construction of a stone bridge across the Pasig.
1632. Foundation of the College of Santa Isabela for girl orphans of Spanish birth.

DON JUAN CERREZO DE SALAMANCA (PRO TEMPORE.)

1633. During the reign of this governor the Archipelago is afflicted by various calamities, such as bad crops, famine, epidemics, a plague of locusts, volcanic eruptions, and Moro piratical expeditions.
1634. Moro pirates to the number of 15,000 lay waste the Visayan Islands and sack the capital of Tayabas in Luzón.
1635. Foundation of the fort of Zamboanga to hold in check the piracy of the Moros.

## DON SEBASTIAN HURTADO DE CORCUERA.

1636. The pirate Tagal, on his return from his excursions among the islands, laden down with booty, is overtaken at Punta Fleches by the little fleet from Zamboanga, under command of Don Nicolas Gonzalez, who wins a complete victory.
1637. Corcuera goes to Mindanao and destroys Lámitan, the seat of government of Sultan Corralat, and attacks a formidable hill which was his last defense. The Moros of Buhayen and Basilan sue for peace and render homage to Spain.
1638. Corcuera arrives at Joló. Obstinate resistance of the inhabitants of that island. They are finally overcome. Corcuera returns to Manila, after leaving at Joló a garrison of soldiers.
1639. Uprising of the Chinese at Calamba. Their forays against San Pedro Macate, Taytay, and Antipolo, and their ultimate defeat and submission. Don Francisco de Atienza conquers the Moros of Lanao and takes possession of the celebrated lake bearing this name. Victories of Don Pedro de Almonte over the Moros in Mindanao and Joló.
1640. Separation of the Kingdom of Portugal from the Crown of Spain, which causes the Dutch to become more audacious.
1641. Three volcanoes burst forth, one in Joló, another in Sanguil, in the southern part of Mindanao, and a third in Arinḡay, in the north of Luzón. Establishment of the Royal College of San Felipe, which is promptly closed.
1642. The Dutch attack the fort of Tanchuy, in Formosa. The Spanish garrison, lacking help, surrenders with the honors of war and returns to Manila. As a precaution against an attack by the Dutch, Corcuera repairs the walls of Manila.
1644. After a governorship of nine years, during which he carried out extensive undertakings, he leaves in the treasury half a million dollars.

## DON DIEGO FAJARDO.

1645. Frightful earthquake at Manila, called the earthquake of San Andrés, on account of having occurred on this day. Manila is depopulated. The earthquakes follow each other at intervals of five days. The victims number 600. The Dutch, summoned by Joló natives, attack the Spanish fort at Joló and Ugalde, which splendidly repulses them.
1646. The Spanish troops retire from Joló after the sultan has signed a treaty very honorable for the Spanish.
1646. Don Lorenzo de Ugarte defeats at Bolinao a powerful Dutch squadron. Three other victories are obtained over Dutch ships.
1647. Thirteen Dutch galleons attack Cavite. It is defended by Don Andrés de Asaldegui until the Dutch admiral is mortally wounded and his vessels retire. The Dutch disembark at Abucay and seize the defenseless town, committing abuses there until they reëmbark, pursued by Don Juan de Chaves.
1648. Victory of the little squadron from Zamboanga over the Joló squadron.
1649. Successful expedition to Borneo to punish the pirates of that island. Uprising of the Visayans under a pretext of an order of Fajardo compelling them to go to Cavite to aid the Tagálos in the construction of ships.
1653. By royal decree the College of San José is given precedence over Santo Tomás.

## DON SABINIANO MANRIQUE DE LARA.

1654. The cathedral having been ruined by earthquakes, the first stone of the new one is laid.

1655. Corrolat, Sultan of Mindanao, breaks the treaty of peace and uses his nephew to bring about the assassination of the Jesuit Fathers Alejandro López and Juan de Montiel, who had gone to Buhayen as ambassadors. Loss of various ships.
1656. Famine and misery in the Islands as a result of a great plague of locusts. Balatamay, nephew of Corrolat, engages in piracy in the Visayan Islands.
1657. The governor of Zamboanga pursues the pirate Balatamay, and, not finding him on the sea, goes to his country and destroys a number of Moro towns.
1658. A great earthquake.
1160. Uprising in the Provinces of Pampanga and Pangasinán. Twenty thousand natives perish.
1662. The Chinese pirate Kotinga demands the submission of the Archipelago, with serious threats. Reply of Manrique de Lara to the insolent demands of the pirate. In order to provide against the attack of Kotinga, select bodies of infantry are formed. A squadron of cavalry is organized, churches, conventos, and houses outside the walls are thrown down. Uprising of the Chinese in the suburbs of Manila and their subsequent submission.
1663. Kotinga dies, and his son, listening to the advice of Father Riccio, a Dominican, desists from his preparation for war, and sends the above-mentioned father as an ambassador to arrange commercial treaties.
1663. In order to concentrate the Spanish forces the garrison of Zamboanga retires and the Moros resume their piratical expedition.

## DON DIEGO DE SALCEDO.

1664. The governor provides for the regular departure of ships for Acapulco, and establishes shipyards in the provinces where it is easiest to obtain timber. Embassies are sent in the interest of commerce to Gamboja, Siam, and Batavia.

## DON MANUEL DE LEON.

1669. Embassy of Don Juan Enriquez de Lozada and Jesuit Father Francisco de Mecina to Macao. These gentlemen bring it about not only that commerce is reëstablished with Macao, but also that it is established with Canton and Ningpo. Commerce with Coromandel and Siam is favored.
1671. The ship *Buen Socorro*, from Acapulco, arrives with \$150,000. The bay of Manila is covered by numerous vessels and commerce is very active.

## DON JUAN DE VARGAS HURTADO.

1678. This governor encourages the development of commerce.
1679. Don Fernando de Valenzuela arrives, exiled to these Islands; he had been the first minister of Carlos II.
1683. After various rivalries between the archbishop, Cabildo, the royal audiencia, and other corporations, Vargas exiles to Pangasinán the Archbishop Don Fr. Felipe Pardo, as the royal audiencia had already decreed several months before.
1684. Don Gabriel Curuzelaegui revokes the sentence of banishment against Archbishop Pardo, but, far from quieting animosities, they are further enkindled by arbitrary measures against Vargas and his friend.
1685. An epidemic of smallpox causes great mortality.
1686. The loss of crops on account of superabundant rainfall.
1687. A conflagration destroys the greater part of the suburbs of Baybay and Tondo.

1688. Don Francisco de Campos Valdivia arrives at Manila, empowered to take action in the matter of the punishment of Archbishop Pardo. Valdivia restores the royal audiencia, which has been destroyed, together with the prison of Oidores.

DON FAUSTO CRUZAT.

1690. This governor takes great pains to swell the public funds, collecting what various private individuals owed the treasury and lowering the salaries of various employees.
1693. The ship *Santo Cristo de Burgos* is lost.
1694. The galleon *San José* is lost and 400 people perish.
1696. The governor publishes the ordinances of good government.

DON DOMINGO ZALBÁLBURU.

During his governorship Zalbáburu concludes the work upon the royal storehouses, reconstructs the royal power house of Malate, repairs the fortifications of Cavite, and attends to the construction of galleons. Commerce is in a flourishing condition.

1704. The galleon *Rosario*, under command of Don Fermin de Salaveria, has a combat with two English ships of war, which were compelled to retire, one of them afterwards being lost. The sultan of Joló visits the sultan of Mindanao; on account of supposed offenses they come to blows, with the result that both are killed.
1705. Wreck of the galleon *San Javier*, commanded by Don Santiago Zalbáburu, brother of the governor.
1706. Death of the Jesuit Father Juan Davila, who introduced into the Philippines the cultivation of cacao, which he brought from Mexico.
1708. Fruitless expedition in search of the Caroline Islands.
1709. Another expedition in search of the Caroline Islands is frustrated by thick weather.

THIRD PERIOD—FROM THE DISMISSAL OF GOVERNOR ZALBÁLBURU (1709) TO THE TAKING OF MANILA BY THE ENGLISH (1762).

DON MARTÍN URZUA.

1709. This governor causes all Chinamen above a certain number to return to their country.
1710. On the coast of California the ship *Nuestra Señora*, commanded by Don Fernando Angulo, defends itself against three English vessels, obliging them to retire. An expedition leaves Cavite for the Carolines.

DON FERNANDO DE BUSTAMANTE.

1717. This governor takes great interest in collecting the sums due the royal treasury and gets together in a single year more than \$300,000.
1718. Reestablishment of the presidio of Zamboanga. Construction of a presidio at Labo, in the southern part of Palawan. Bustamante sends his nephew as ambassador to the King of Siam in order to arrange treaty of commerce.
1719. The governor, upon learning that a conspiracy is being formed against him, in which the municipal authorities are taking part, commits all sorts of abuses. Rebellion breaks out and the mob assassinates Bustamante and his son.

1720. Five thousand Moros besieged Zamboanga for two months. The governor, Don Sebastian Amorrea, performs prodigies of valor and saves the city. The council of war decrees the abandonment of the presidio at Labo.

DON TORRIBEO JOSÉ DE COSIO, MARQUES DE TORRE-CAMPO.

1721. Gen Antonio Rojas pursues the Moro pirates without result.  
 1723. Another little squadron under command of Don Andrés Garcia Fernandez, but the Moros grow bolder and bolder.  
 1725. The Sultan of Joló sends to Manila a Chinaman named Kikan in order to sue for peace.  
 1726. There is signed at Joló an agreement between the sultan and Spain, and the Moros immediately violate the agreement, beginning their piratical operations again. Seventy embarkations manned by Chinese pirates are overtaken and completely destroyed by the Spanish armada. The galleon *Santo Cristo de Burgos* is lost, the crew being saved.

DON FERNANDO VALDÉS.

1729. Valdés repairs the fortifications and provides armaments for the plaza.  
 1730. A fleet of 20 vessels manned by 3,000 Sulu pirates causes great damage among the islands of the south and attacks Taytay, which Don Pedro Lucena successfully defends.  
 1731. A strong squadron sails from Cavite to Sulu and punishes the Moros, burning towns, ravaging the fields, and killing many individuals.  
 1733. A conflagration destroys the royal storehouses at a time when they were quite sufficient to the public needs.  
 1734. Fruitless expedition is sent in aid of the Sultan of Tamontaca. The Moros attempt to surprise the presidio of Zamboanga, but are repulsed.  
 1735. Two thousand Moros attack Taytay. Brilliant defenses of this town by Cienfuegos, aided by three monks. Three large Dutch warships anchor in the Bay of Manila, demanding a vessel of their nation which has been made a prize by Don Francisco Muñoz in the waters near Mindanao, and an agreement is reached with them. There arrives a royal cedula which settles in favor of the commerce of Manila the vexatious questions of the introduction into America of silks from China.  
 1737. Don Juan Gonzales del Pulgar is sent to Sulu to ratify a compact of peace with the new ruler of that island.

DON GASPAR DE LA TORRE.

1741. The governor makes arrangements for the defense of the coast and the pursuit of the Moro pirates.  
 1742. The English Admiral Anson captures the ship *Covadonga*, which was on the voyage from Acapulco.

INTERREGNUM—DON FR. JUAN DE ARRECHEDERRA, A DOMINICAN, BISHOP-ELECT OF NUEVA SEGOVIA.

1745. The bishop-governor, with great activity and zeal, undertakes fortifications to defend the plazas, orders the casting of cannon, provides a suitable amount of munitions of war, and authorizes Don Geronimo Itta Salazar to arm his tender, the *Santo Domingo*.  
 1746. In defiance of a royal prohibition which is very harmful to business the ships *Rosario* and *Pilar* prepare to sail for Acapulco. The governor of Zamboanga orders that each year an expedition be sent against the pirates.  
 1747. Two Dutch ships make a futile attempt to take possession of Basilan.

## DON FRANCISCO JOSÉ DE OBANDO.

1750. The piracy of the Moros continues, with the aid of Bantilan.
1751. A squadron sets sail in order to place Ali-Mudin again upon the throne of Joló under the name of Fernando I. The treachery of Ali-Mudin is revealed by a letter from him to the Sultan of Tamontaca. He is sent a prisoner to Manila.
1752. Expedition to Joló with little result. An expedition sent to take possession of Palawan is obliged to return to Manila because its members fall sick. Two thousand Moros besiege Iligan, and Father Ducos, a Jesuit, defends the plaza and defeats the Moros.
1754. All the ocean regions of the Archipelago are invaded by Moro pirates, who carry terror and misfortune wherever they land. This is the worst piratical movement on the part of the Moros up to the date indicated.

## DON PEDRO MANUEL DE ARANDIA.

1754. The Governor reorganizes the militia, augments the salaries of the army men, creates what is called the King's Regiment and four brigades of artillery, and establishes artillery schools. A terrible eruption of Taal attended with sad results. A plague arises, produced by the multitude of fishes killed by the eruption, which float upon Taal Lake. Father Ducos takes command of the fleet of Iligan and directs it so well that it destroys 150 hostile boats and kills 3,000 Moros.
1755. Arandia expels the Chinese pagans and constructs an alcayceria, where Chinese who come to engage in trade are obliged to reside temporarily. Chinese who have accepted Christianity are permitted to remain in the Islands, but only for the purpose of tilling the soil, being prohibited from engaging in business. A presidio is constructed at Misamis. An expedition under command of Don Pedro Zacarias Villareal goes to Joló, where peace is announced between Bantilan and the Spaniards, but once more the Moros break their agreement.
1756. Don Pedro Gaztambide wins a great victory over thirty-eight piratical vessels off the coast of Batangas.

## DON MIGUEL ROJO, ARCHBISHOP OF MANILA.

1761. Rojo takes command by virtue of a royal cedula which he receives. He shows himself kindly disposed toward Ali-Mudin.
1762. An English squadron of thirteen ships, with more than 6,000 men, under command of Admiral Cornish and of Brigadier Draper, arrives at Manila, which is unprepared to resist attack.

## FOURTH PERIOD—FROM THE TAKING OF MANILA BY THE ENGLISH (1762) TO SEDITION OF TAYABAS (1841)—DON SIMÓN DE ANDA SALAZAR.

1762. The junta of authorities names Anda governor; he leaves Manila and goes to Bulacan. Capture and sacking of Manila by the English. Anda makes himself known in Bulacan as governor and prepares for the defense of the country, with the aid of the monks. Uprisings in the provinces.
1763. Expedition of the English to Bulacan. Asturian Bustos harasses the English, who retire to Manila. Bustos establishes his general headquarters at Malinta, from which place he makes forays, even to the suburbs of Manila.
1764. Anda receives dispatches from the King informing him of the treaty of peace with the English. The new Spanish governor arrives, to whom Anda turns over the governorship of Pampanga.

## DON JOSÉ RAON.

- 1765. The war frigate *Buen Consejo* comes to the Philippines by way of the Cape of Good Hope, thus inaugurating direct communication between Spain and the Philippines. Two eruptions of the volcano Mayón.
- 1767. A Moro piratical expedition enters the Bay of Manila.
- 1768. The Jesuits are expelled from the Philippines by order of Carlos III.
- 1769. It is ordered that the Chinese be expelled from the Philippines, but this order is only partially fulfilled.

## DON SIMÓN DE ANDA SALAZAR.

- 1770. Anda repairs the walls of Manila and within a few months brings about the construction of several war vessels.
- 1773. The frigate *Deseada* is dispatched to Batavia to reestablish business relations.
- 1774. Shameful conduct to the Italian Cencelly, to whom Anda has intrusted the command of a squadron.
- 1775. The Moros assassinate the garrison left by the English in the Island of Balambañgan.

## DON JOSÉ BASCO Y VARGAS.

- 1778. Basco during his governorship shows a decided desire to develop agriculture. He obtains seeds from other countries, and causes more than 4,000 mulberry trees to be planted in Camarines Sur for feeding silkworms.
- 1778. In a short time Basco rids the country of evildoers. The order for the expulsion of the Chinese is revoked.
- 1779. Basco grants rewards to those who are conspicuous for their success in agriculture.
- 1781. The Sultan of Joló sues for peace and returns a captured vessel. Establishment of the Economical Society of Friends of the Country.
- 1782. The tobacco monopoly is established, and as a result the public funds are considerably increased. Successful expeditions of Don José Gómez to Burias.
- 1785. The King authorizes the creation of the Royal Company of the Philippines.
- 1786. Royal order approving the establishment of the powder magazine.

## DON RAFAEL MARIA DE AGUILAR.

- On account of the war with England he reinforces the fortifications, augments the navy, establishes a dockyard at Corregidor, and puts 10,000 men under arms.
- 1794. A bastion is constructed in Binondo which dominates La Barraca.
- 1796. The ships *San Pedro*, *Montanes*, and *Europa*, and the frigates *Fama* and *Pilar*, under command of Don Ignacio Maria de Alava, who becomes chief of the squadron which is composed of the above-mentioned vessels, and, in addition, of three frigates which have previously arrived. By royal order the transfer of the bastion of San Blas de California to Cavite is provided for. Great earthquake.
- 1797. The squadron under command of Alava sails in pursuit of an English convoy, but encounters a typhoon. Loss of the *San Andrés* on the coast of Albay.
- 1798. An English squadron flying a Spanish flag arrives at Zamboanga and the governor, Don Raymundo Español, defeats the enemy and saves the plaza. The Moros attack Baler, Casiguran, and Palanan.

1799. Order for a definite census of the natives. Order prohibiting the secretion of fractional silver currency. The frigate *Pilar* arrives with \$1,200,000, thus relieving the financial difficulties.
1800. The marine commandancia is created. Foreigners are prohibited from living in the Philippines.
1801. Raon's "Ordinances of Good Government" are suppressed.
1803. A magistrate is sent to Mindoro in order to promote the development of the island. The English again take possession of the Island of Balamban.
1805. The English again attack Zamboanga and are defeated. Sainte-Croir is commissioned to investigate the gold mines of Mambulao, in Camarines, and later publishes his report. The complete independence of the Manila custom-house is decreed by royal order.
1806. The English abandon Balamban.

INTERREGNUM—DON MARIANO FERNÁNDEZ DE FOLGUERAS.

1806. Folgueras takes precautions against a possible attack upon Manila by the English.
1807. Uprising in Ilocos Norte, which is subdued chiefly by the monks.
1808. The order of Santo Domingo favors the Company of the Philippines with a loan.
1809. The French sloop of war *Mosca* attacks Batangas and the parish priest at the head of the natives repels the sloop.

DON MANUEL GONZALEZ AGUILAR.

1810. Aguilar proposes the suppression of ships to Acapulco and to concede to merchants the right to fit out private ships for voyages to America.
1811. Publication of the first newspaper in the Philippines.
1813. The constitution of 1812 is published in Manila.

DON JOSÉ DE GARDOQUI JARAVEITIA.

1813. By the decrees of the Cortes the ship to Acapulco is suspended. The last one starts in 1811 and returns in 1815. The Moros attempt in vain to take Zamboanga.
1814. Movements originate in the Philippines for the publication and revocation of the constitution of Cádiz. The English shrewdly attempt to take possession of Joló and Mindanao. The introduction of opium is prohibited. Great eruption of the volcano of Mayón.
1815. By royal order the apostadero de marina (shipyard) is suppressed.

DON MARIANO FERNÁNDEZ DE FOLGUERAS.

1817. Expedition of Fr. Juan Prieto to the country of the savage Mayoyaos. A royal order decrees that in the convents of monks and nuns there shall be established schools for boys and girls.
1818. Naval victory over the pirates on the coast of Albay obtained by Don Pedro Esteban.
1819. Reestablishment of the Royal Economic Society of the Philippines.
1820. Royal cedula, according to which there is conceded the suppression of duties during ten years on natural and industrial products of the Philippines imported into the Peninsula in ships flying the flag. Cholera in Manila. There is prevalent among the natives a belief that the foreigners have poisoned the waters. The mob assassinates the English and French residents in Manila to the number of 28; afterwards they attack the Chinese.
1821. The constitution of 1812 is again sworn to in Manila. Creation of the Naval Academy.



## DON JUAN ANTONIO MARTINEZ.

1822. With Martinez many officials from the Peninsula come to the Philippines, following the counsel which had been given to Folgueras, because those already there were almost all Spanish-Americans.
1824. Strong earthquake in Manila. The statue of Carlos IV is placed in the Plaza del Palacio. Fortunate expeditions under command of Don Alonso Morgado against the pirates.

## DON MARIANO RICAFORT.

1825. Ricafort brings a painting of Fernando VII, and there is given to it the reception which would have been given to the royal person.
1826. By royal order the religious orders again take charge of certain parishes which had been given to the secular clergy.
1827. The reestablishment of the dockyard is decreed. An expedition to suppress the rebellion in Bohol.
1828. Ricafort prohibits strangers from going into the provinces to acquire products of the country. The royal order commands the protection and cultivation of cotton and the introduction of machinery for making thread and cloth of said article. Royal order commands the establishment of a mint in Manila. Earthquake in Manila.
1830. The arrival in Manila of the expeditionary regiment of Asia in consequence of a request by Ricafort to Spain for European troops.

## DON PASCUAL ENRILE Y ALCEDO.

- Enrile makes a general map of the Archipelago. He causes roadways and smaller paths to be made connecting said roads and puts up several bridges.
1830. By royal order the eight districts fronting the Moros are declared military and political penal districts.
1832. By royal order the commercial code promulgated in Spain is extended to the Philippines, with such variations in its application as the Archipelago requires.
1833. Royal order in regard to the control of pious works.
1834. Enrile causes the publication of "La Guia de Forasteros," with interesting notices.
1835. The board of trade is organized.

## INTERREGNUM—DON PEDRO ANTONIO SALAZAR.

1835. There is established a gradual impost by stamps on bills of exchange.
1837. A department of inspection of mines is organized in these Islands.

## DON ANDRÉS MARIA CAMBA.

1837. Camba declares to the government that the plans adopted of making peace with the Sultan of Joló does not bring a single decided advantage to commerce. Father Manuel Blanco, Agustin Fr., publishes "La Flora de Filipinas."
1838. The post-office department begins its work according to the reforms published the year before. There is created in Spain a consulting committee for the business of the colonies.

## DON LUIS LARDIZABAL.

1839. Lardizabal, who is a Visayan, gives the name of Nueva Vizcaya to a new province which is formed from the Province of Cagayán. Recognizing the excellent quality of Philippine tobacco and at the same time the defective

methods of manufacture, he takes measures to prevent adulterations. There is published in Manila a weekly paper entitled "Current Prices of Manila."

1840. Inauguration of School of Commerce.

FIFTH PERIOD—FROM THE SEDITION OF TAYABAS (1841) TO THE GOVERNMENT OF DON DIEGO DE LOS RIOS, LAST SPANISH GOVERNOR-GENERAL IN THE PHILIPPINE ISLANDS (1889).

DON MARCELINO DE ORAA.

1841. Sedition in Tayabas promoted by a certain Apolinario de la Cruz, called by his fanatical followers King of the Tagálos, and to whom they attribute supernatural powers. Commandant Huet completely overthrows these rebels.
1842. A circular recommending the discovery of coal mines. The publication of the order concerning the free construction of ships.
1843. Uprising in Malate of a regiment composed of soldiers from the Province of Tayabas.

DON FRANCISCO DE PAULO ALCALÁ.

1843. The shipyard of Masbate is transferred to Cebú. Certain rules are published to the consignees of the Chinese sampans in regard to unloading.
1844. Takes possession of the Island of Basilan to better control the Moros. The natives and half-castes are prohibited the smoking of opium.

DON NARCISCO CLAVERIA.

1844. Claveria, with the consent of the ecclesiastical authority, reforms the calendar in the Philippines to conform to that of Spain and America, suppressing the 31st day of December, 1844; therefore the Archipelago finds itself a day in advance. The French attempted to take possession of the Island of Basilan.
1847. A fire reduces to ashes the suburbs of Santa Cruz and Quiapo. An expedition is sent under the command of Don Mariano Oscariz to subdue the bloody savages of Mayoyaos, in Nueva Vizcaya. Important conquest of Dávao, on the south of Mindanao, by José de Oyanguren. Political and military governors are prohibited from engaging in commerce.
1848. Claveria directs an expedition to the islands of Balanguingui; destroys completely the towns occupied by the pirates and rescues 200 captives, several of these Dutch from Java. There are purchased in London the steamers *Magellanes*, *Elcano*, and *Reina de Castilla*, which are the first ships of this kind seen in the Philippines. Erection of the monument to Magellan in Manila.

DON ANTONIO BLANCO.

- Blanco forms a body of vaccinators and obliges all children to be vaccinated. Monthly lottery is established in Manila.

DON ANTONIO DE URBIZTONDO.

1850. The Moros from Joló attack Sámar and Camiguin. Urbiztondo grants permission to the planters to introduce Chinese, who are to devote themselves exclusively to agriculture.
1851. Urbiztondo himself directs an expedition to Joló, destroying the forts and capturing 112 cannon, reducing to ashes the quays and a multitude of boats. The tobacco from Cagayán, in the north of Luzón, is given a premium and gold medal at the Universal Exposition in London.

1852. Inauguration of the suspension bridge which united Arroceros with Quiapo. The Spanish-Philippine Bank begins its operations. A prison is established in Pollok. The Official Bulletin of the Philippines is established. Various earthquakes are felt.
1853. Eruption of the volcano of Mayón.

## DON MANUEL CRESPO.

1855. The tribunal of commerce is reestablished. Naval Officer Gonzales captures in the waters of Joló a pirate boat, and, with Villaircencio, they destroy a pirate fleet, which at that time was being constructed by the Moros. A cyclone causes great destruction. Eruption of the volcano Macaturang, in Mindanao.

## DON FERNANDO DE NORZAGARAY.

1857. Norzagaray decrees that the official accounts shall be carried on in the decimal system, for the exchange of money. Publishes a very energetic decree against criminals.
1859. The Jesuits return to the Philippines.

## DON RAMÓN M. SOLANO.

1860. Creation of a civil government for the Province of Manila. Foundation of the Maritime Mutual Benefit Society.

## DON JUAN HERRERA DAVILA.

1860. Issues an order in regard to the duties of petty governors. Madrazo and Malcampo pursue the pirates with good results.

## DON JOSÉ LEMERY.

1861. The Official Bulletin of the Philippines takes the name of the Manila Gazette, by royal order of the previous year. A politico-military government is established in Visayas, and another in Mindanao. The beginning of work of coining in the mint in Manila. The School of Botany and Agriculture is established.

## DON RAFAEL ECHAGUE.

1862. During this administration the Archipelago is afflicted by cholera, fire, flood, cyclones, and locusts.
1863. Creation of the minister for the colonies. Great earthquake, which almost reduces Manila to a mountain of ruins, with the death of 400 persons and the injury of some 2,000.
1864. The Ayuntamiento founds a municipal school for girls in charge of the Daughters of Charity. Lightning sets fire to the general storehouse of tobacco, with a loss of \$2,000,000. Traitorous conduct of the Dato Uto in the Río Grande de Mindanao.
1865. Inauguration of the normal school for (female) school-teachers.

## DON JUAN DE LARA.

1865. A great fire destroys a large part of the suburbs of Tondo, Santa Cruz, and Quiapo.
1866. Rules in regard to the taxation of the Chinese. Establishment of a government place of deposit. The Moros of Supangan and Symuay, who had risen in arms, are conquered.

## DON JOAQUIN DEL SOLAR (SECOND TIME).

A commission is named to study reforms in the penal code for the colonies. There is created in Manila a central committee of agriculture, industry, and commerce.

## DON JOSÉ DE LA GÁNDARA.

1866. During this administration many improvements are made in Manila and its suburbs. Various royal orders arrive concerning the treasury, justice, militia, public works, etc.
1867. The College of San Juan de Letran is declared a college of secondary instruction. Great floods in Manila and in Ilocos. Loss of the steamer *Malespina* on its return from Hongkong.
1868. Establishment in Nueva Cáceres of the College of Santa Isabel. An expedition for the punishment of certain wrongs committed by the savages of the provinces in the north of Luzón.

## DON CARLOS DE LA TORRE.

1869. The Governor-General suppresses the alabarderos who served in the palace. The pardon of criminals and the formation from them of the company of Guías de la Torre (de la Torre's Guides) to pursue criminals; an unfortunate measure, which multiplied crimes and disturbances.
1870. Several hundred vagabonds are deported to Balábac and Mindanao. The rebuilding of the cathedral, ruined by the earthquake of 1863, is begun.
1871. De la Torre attempts to carry out the orders of the minister of the colonies, Senor Moret, secularizing the University of Secondary Education.

## DON RAFAEL IZQUIERDO.

1871. Eruption of the volcanoes of Camiguín and of Mayón. The gunboats destroy several pirate boats and burn towns.
1872. A vast conspiracy, which fails in Manila and is transferred to Cavite, is controlled in two days. Navy regiment of artillery is disbanded and a regiment of Peninsula artillery arrives.
1873. A telegraphic line is established in various provinces of Luzón. A line of Spanish steamers is established between the Archipelago and the Peninsula. The ports of Legaspi, Tacloban, and Leyte are opened to commerce.

## DON JOSÉ MALCAMPO.

1875. Inauguration of the Bridge of Spain. Proclamation of Alfonso XII, King of Spain.
1876. Concurrency of the Philippines in the exposition at Philadelphia. Conquest of Joló. Construction of fortifications for the preservation of the conquered country. Don Pascual Cervera remains in Joló as governor.
1878. Inauguration of the waterworks system of Carriedo. Promulgates in these Islands a reduction of the number of feast days. The Sultan and the datus of Joló sign articles of capitulation, acknowledging the rights of Spain.

## DON FERNÁNDO PRIMO DE RIVERA.

1880. Strong earthquake in Manila. Cable communication between Luzón and Spain established.
1881. Royal decree does away with the tobacco monopoly. Savings bank is established, and the waterworks system initiated by Moriones is inaugurated.
1883. The Philippines are represented in the exposition of Amsterdam.

## DON JOAQUIN JOVELLAR.

1883. Reduction from forty to fifteen days in the work required by the State from each person, and the placing of a provisional tax of \$1.50 on each person. The general plan for railroads in Luzón is approved.

## DON EMILIO TERRERO.

1885. Danger of conflict between Spain and Germany in respect to sovereignty over the Islands known as the Carolines.  
 1886. Termination of the dispute between Spain and Germany in regard to the Carolines and Palaos by the arbitration of Pope Leo XIII.  
 1887. Commencement of work on the railroad from Manila to Dagupan.  
 1888. Political manifestation, Masonic and antipatriotic, prohibited by certain friends of Terrero, this being the motive for relieving this governor.

## DON VALERIANO WEYLER.

1888. The tramway from Manila to Malabón is inaugurated.  
 1889. The agricultural school is established in Manila. Registry of property is also established.  
 1890. The School of Practical and Professional Arts and Trades is established. Telephone system inaugurated in the Philippines.  
 1891. Inauguration of the railroad from Manila to Calumpit. Campaign against the Moros of Lake Lanao.

## DON ULOGIO DESPUJOL.

1892. Inauguration of the railroad from Calumpit to Dagupan. Celebration of the fourth centennial of the discovery of America by Christopher Columbus.

## DON RAMÓN BLANCO.

1893. By royal order municipal laws in the Provinces of Luzón and the Visayas are modified according to the so-called reforms of Maura.  
 1894. Campaign against the Moros in the north of Mindanao.  
 1895. Opening of the first regional exposition of the Philippines. Electric light is established in Manila. Larahui, of Lake Lanao, is captured.  
 1896. P. Mariano Vil, an Agustin, denounces to the authorities, with clear proofs, a conspiracy that is about to be carried out. The revolution is established; conflicts take place in the vicinity of Manila; publication of an amnesty; the rebellion extends from the neighboring provinces to Manila; insurrections discovered and suppressed in Joló and Palawan.

## DON CAMILIO POLAVIEJA.

1896. Polavieja takes command the 12th of December and begins operations against the rebels. The military courts become very active and many Filipinos held as authors of the conspiracy are executed, among them Rizal.  
 1897. A combined attack by six columns against the place known as Cacaroon de Sile breaks the insurrection in the Province of Bulacan. Fresh reinforcements arrive from Spain. The execution of Filipinos continues, and conflicts take place in the Provinces of Manila, Bataan, Pampanga, and Batangas. Publication of an amnesty; regiments of native volunteers are organized; the conquest of the Province of Cavite is begun; the taking of Silang, Dasmariñas, Imus; granting of another amnesty; taking of Noveleta and San Francisco de Malabón.

## DON FERNÁNDO PRIMO DE RIVERA.

1897. Primo de Rivera makes addresses to the people and to the army and begins operations. Taking of Indang, Maragondón. Publication of amnesty. Various garrisons are established. Negotiations for peace treaty of Biac-nabato. Aguinaldo and various chiefs are deported to Hongkong, where Aguinaldo collects the \$400,000 on the check of the Hongkong bank which was given him. Earthquake in Mindanao and Joló. Terrible tornado in Samar and Leyte.
1898. A Te Deum is sung in the Philippines and in Spain for peace. Some uprisings in Luzón.

## DON BASILIO AUGUSTIN.

1898. Conferences between Aguinaldo and the consul-general of the United States in Singapore. The American squadron destroys the Spanish squadron in the Bay of Manila. Blockade of Manila. Americans bring Aguinaldo and other chieftains from Hongkong to Cavite. Organization of the Philippine militia. Organization of the advisory assembly of the Philippines and publication of a program of autonomy. Capitulation of Manila. Treaty of peace signed at Paris.

## DON DIEGO DE LOS RIOS.

1899. Embarkation of Spanish troops for the Peninsula. Rios returns to Spain and General Jaramillo remains as president of the commission for the selection and transportation of material of war.
1899. Conflict between Filipinos and the United States Army. First Philippine Commission appointed. Spanish troops sent to Spain. Iloilo occupied. Treaty of peace ratified. Civil government established in Negros. General Lawton killed.
1900. Taft Commission appointed. Civil government established. Provision made for provincial and municipal governments. Courts reorganized.
1901. Aguinaldo captured. Collapse of insurrection. Provincial governments organized. Harbor and highway improvements. Revised tariff approved. Printing plant purchased. Transport load of teachers sent to the Philippines.
1902. Plague of cholera and rinderpest. Civil Government Act passed by the Congress of the United States. Louisiana Purchase Exposition Board organized.
1903. Philippines currency established. Mindanao (Moro) Province organized. Governor Taft appointed Secretary of War. Luke E. Wright, Civil Governor.

## Chapter XIII.

### GOVERNMENT.

Authority of the President—Treaty of peace—First Philippine Commission—The Taft Commission—Division of authority—Legislative power—Provisions for a census—Executive power—Executive Departments—Board of Health—Bureau of Forestry—Mining Bureau—Bureau of Agriculture—Weather Bureau—Bureau of Non-Christian Tribes—Bureau of Public Lands—Government Laboratories—Bureau of Patents, Copyrights, and Trade-Marks—Department of Commerce and Police—Post-offices—Revenues and expenditures—Coast and Geodetic Survey—Constabulary—Coast Guard—Bureau of Engineering—Department of Finance and Justice—Treasurer—Auditor—Customs—Immigration laws—Sources of income—Public instruction—Public printing—Instructions of the President.

The Supreme Court of the United States has held that, as Commander in Chief, the President is authorized to control the movements of the land and naval forces placed by the Constitution at his command. Under this authority the President, through the Secretary of the Navy, issued the directions which resulted in the destruction of the Spanish fleet of war in the Harbor of Manila on May 1, 1898. The President may, in the language of the court, "direct the invasion of an enemy's country and subject it to the authority of the United States, and he may form military and civil governments in such territory when so occupied, and Congress may not by any legislation impair such authority." As a matter of military necessity such invasion was directed, and culminated in the surrender on August 13, 1898, of the Spanish forces in and about the city of Manila, thus beginning the first phase of American government in the Philippines—that of hostile occupation of an enemy's territory.

On the following day General Merritt, commanding the expeditionary forces, under instructions contemplative of the success of the American arms, issued a proclamation to the Filipino people residing within the capitulated territory. The proclamation announced the assumption of military government by the United States and its intention to enforce respect for private rights of persons and property. It provided for the establishment of provost courts and military commissions, but directed the continuance of the usual and ordinary tribunals of justice so far as compatible with the purposes of military government. At the same time certain officers of the Army were designated to assume control of the customs service and of the other necessary fiscal offices. These measures were promptly followed, as the need became apparent, by the organization of other departments and bureaus for the dispatch of public business.

On December 10, 1898, the treaty of peace with Spain was concluded at Paris, and upon its ratification the Philippine Islands became a part of the territory of the United States, and so entered upon the second phase, or that of a *de facto* government defeasible only by direct legislation of Congress, to which the territory has now become subject. Meanwhile, the military government, taking the place of a deposed sovereignty, of necessity continued till the establishment of something more permanent. With this object in view the President, in January of 1899, named a commission of three civilian members and the commanding officers of the Army and Navy present in the Philippines to investigate and report upon the condition of affairs in the Philippines. No doubt the natural ambition of the people to participate in a free and representative government in which all necessary checks and balances against abuse of power were present would have been speedily realized but for the unfortunate revolt, begun on February 4, 1899, against the lawful authority of the United States. That it was clearly the intention of the Chief Executive to urge upon Congress the establishment of some permanent, adequate, and desirable form of government is known from his public statements and his written instructions to the military government through the Secretary of War.

Notwithstanding the added necessity for martial law in the reestablishment of peace and order, the commission uninterruptedly pursued its labor of collecting and compiling information about the country, its people, and their desires, and did much toward the conciliation and reassurance of the better classes of the Filipinos. The report of the Commission was completed and transmitted by the President to Congress under date of February 2, 1900.

In April, 1900, the President appointed a second commission, composed entirely of civilian members and including those of the former commission who were available for appointment. With conciseness, but comprehensiveness of detail, and with elegance and clearness of diction, the President, under date of April 7, 1900, presented his instructions to the commission in a paper which will be long distinguished among our greatest papers of state.

In these instructions the Commission was vested with certain legislative powers theretofore exercised by the Military Governor, and was charged with the duty, among others, of effecting local self-government whenever conditions would permit and of instituting certain desired changes in judicial procedure. Executive authority, however, remained in the Military Governor.

In the meanwhile Congress, not wishing to impede the efforts of the Administration in the restoration of order, passed no general legislation in limitation of the powers of the existing government until the passage of the Spooner amendment to the Army appropriation bill for 1902,



approved March 2, 1901, which amendment, in effect ratified the established authority, but imposed general restrictions upon the power to grant franchises and laid special inhibitions in relation to certain franchises of a quasi public nature.

"The natural classification of governmental powers is into legislative, executive, and judicial," but "when all the powers of sovereignty are exercised by a single person or body, who alone makes laws, determines complaints of their violation, and attends to their execution, the question of a classification can have only a theoretical importance." Nevertheless, no matter how unconsciously exercised or indefinitely defined, these natural functions of government are present, though all the *modus operandi* may for the time being be vested in the hands of a representative person or body, when the acts of that person or body are honestly directed toward the welfare of the governed.

There is lacking, however, that restraint over the action of each, termed checks and balances of government, which is imparted by the independence of the several departments of governments. Thus we have seen in the history of the Filipinos and of other peoples with whom the United States was compelled to assume relations of a fiduciary character, under the exigencies of war, that the centralization of so many duties in a representative of the Crown often led, whether from personal cupidity or fault of the system, to the absorption of other powers and to frequent encroachments on the liberties of the people and their consequent restiveness thereunder.

It is believed, however, and especially since the passage of the act approved July 1, 1902, that the details of the present Government may be, with propriety, treated under academic classifications.

The legislative power of the present Civil Government is vested in the Philippine Commission composed of the members named in the President's instructions dated April 7, 1900, and three additional members, who are Filipinos. The Civil Governor is *ex officio* President of the Commission. Its power of legislation is limited only by special restrictions laid upon it by Congress, but is subject to the control and approval of the President of the United States through the Secretary of War. Civil appointments are made by and with its consent. The Commission sits in regular sessions and conducts its business with the aid of standing and special committees.

Section 7 of the act of Congress approved July 1, 1902, provides that two years after the completion and publication of the census, which was ordered in the same act, and provided there is a general and continued peace during such period, the Commission shall call a general election for delegates to a popular assembly, which assembly shall succeed to the usual legislative powers of a lower house, with but some important exceptions; as, for example, should the lower house refuse or fail to

vote the necessary appropriations for the maintenance of the Government, the upper house, or, in other words, the Commission, can vote the appropriations of the previous year without the consent of the lower house. The assembly so elected will in turn have authority to elect two resident commissioners to the United States, who will be entitled to official recognition by all the Departments at Washington.

The executive authority is vested in a Civil Governor, assisted by a cabinet of four chiefs of Department, under whose jurisdiction are organized the various administrative Bureaus.

The President in his instructions dated April 7, 1900, to the Commission, directed it to report when in its opinion the central administration might safely be transferred from military to civil control, together with its recommendations as to the form of government to be established. Upon the practical pacification of the Islands such a report was made by the Commission, and the President accordingly, under date of June 21, 1901, directed that on and after July 4, 1901, the executive authority theretofore exercised by the Military Governor in the Philippines be vested in a Civil Governor, to which office he appointed the Hon. William H. Taft, the President of the Commission. The acclamation with which his inauguration was received and more recent demonstrations in his favor would seem to be a sufficient indication of the popularity of the present form of government no less than appreciation of personal attributes of distinction and worth. The appointive power is vested in the Executive, by and with the advice and consent of the Commission, and all persons performing civil duties in the Islands are required to report to him.

On October 29, 1901, by direction of the President, a member of the Commission was appointed Vice-Governor, with authority to act as Civil Governor whenever the Civil Governor is incapacitated by illness, or certifies that his temporary absence from the seat of government makes it necessary for the Vice-Governor to exercise such powers and duties.

The Executive Secretaryship is a survival of the office of secretary to the Military Governor. The Executive Secretary is charged with the correspondence of the Civil Governor and the issuance of his directions to the administrative Departments and Bureaus, and is the official channel of communication between the provincial governments and the Central Government of the Islands.

There are four Executive Departments in the administration of affairs in the Philippine Archipelago, viz, Department of the Interior, Department of Commerce and Police, Department of Finance and Justice, and Department of Public Instruction. Each Department is presided over by a Secretary, selected from among the members of the Commission, who exercises the duties of the Secretaryship in addition thereto.

The Department of the Interior has within its cognizance the follow-

ing Bureaus: Board of Health of the Philippines, Quarantine Service of the Marine-Hospital Corps, Bureau of Forestry, Bureau of Mining, Bureau of Agriculture, Weather Bureau, Bureau of Non-Christian Tribes (now called Ethnological Survey for the Philippine Islands), Bureau of Public Lands, Bureau of Government Laboratories, Bureau of Patents, Copyrights, and Trade-Marks, and the Philippine Civil Hospital.

The Board of Health of the Philippines was constituted by act of the Philippine Commission dated July 1, 1901. It has general supervision over all the interests of the public health in the Philippines and is especially charged with the duty of studying vital statistics. It is directed to make investigation into the causes, pathology, and means of preventing diseases of all kinds, especially epidemic diseases, including those of domestic animals as well. It is charged with the duty of preparing and, to a certain extent, with enforcing suitable sanitary measures and laws. To the Bureau is attached a sanitary engineer who is charged with supervision and consultation in all constructions and repairs involving the state of the public health. The Board consists of a commissioner of Public Health, chief health inspector, sanitary engineer, superintendent of Government Laboratories, and the secretary of the Board as active members, and the chief surgeon of the Army in the Philippine Islands, the chief officer of the Marine-Hospital Service in the Philippine Islands, the president and vice-president of the Association of Physicians and Pharmacists of the Philippine Islands as honorary members. The honorary members are entitled to attend the sessions of the board and to advise and be heard by it, but are not entitled to a vote in its decisions.

Under date of January 4, 1900, in order to prevent the introduction of epidemic disease into the Philippines, the President ordered the detail of officers of the United States Marine-Hospital Service as a nucleus about which to institute and maintain a service similar to that of the United States. The provisions of the act of Congress approved February 15, 1893, regulating the quarantine service and imposing certain duties upon it, were, at the same time, by executive order extended to the Philippines and the regulations of the Marine-Hospital Service, so far as practicable, were ordered enforced. The expenses of the Quarantine Service are charged against the revenues of the Islands, but are limited not to exceed \$300,000 annually. Closely following the promulgation of the President's order, complete and effective disinfecting apparatus was installed and a modern detention station erected in the Bay of Manila. In addition to Manila, the ports of Cebú and Iloilo are in charge of officers of the Marine-Hospital Service. Medical officers of the Army formerly performed the duties of boarding and inspecting vessels in other ports, but these duties are now performed by the local health officials.

Too much importance can not be attached to the operations of this

Bureau in minimizing the danger of infection from plague and cholera introduced from Oriental ports and in the prevention of the spread and introduction of these dread diseases into the United States.

In common with most of the Bureaus organized during the Military Government of the Islands, the Bureau of Forestry was inaugurated under the direction of an officer of the Army, who assumed charge under date of April 14, 1900. Upon a careful study of present and precedent conditions, comprehensive regulations governing all matters pertaining to forestry were published on June 27 following. This Bureau is charged with the onerous duty of instilling into the minds of the people knowledge of approved lumbering methods and of fostering and protecting vast tracts of valuable public and private forest lands. It employs and assigns to its various districts of observation the most experienced foresters available, and efforts are being made to induce universities to increase their facilities for imparting information of this character to the native youth that they may in this respect find profitable employment for the future.

The Bureau of Mining was established March 10, 1900, and was in a measure the successor to several independent bureaus operated under the Spanish régime. It confined its early efforts to the compilation and arrangement of the archives of its Spanish predecessors and to the examination of claims for concessions which had been pending upon the transfer of government. The Spooner amendment, before referred to, contained prohibitions against the granting of mining concessions, which prohibitions, however, were removed by act of Congress approved July 1, 1902. The latter act makes minute and liberal provisions for the filing of claims for mineral lands, and it is thought that the hitherto languishing mining industries will receive considerable impetus under its workings.

Upon the Bureau is imposed the duties of general supervision over mines and mining operations, the conduct of geological surveys, and the preparation of reports and statistics on all these matters, including mineral springs.

An act of the Philippine Commission dated October 8, 1901, created a Bureau of Agriculture to conduct investigation and disseminate useful information with reference to the agricultural resources of the Philippines. It is, too, making extensive research and inquiry into the subject of the animal industry of the islands. It owns and operates farms at Magalang (Pampanga) and La Carlota (Western Negros) and operates experimental stations at Iloilo, Cebú, Isabela, Ilocos, and Albay.

While established but a short time its published reports and circulars are attracting considerable attention and interest, and through their agency much is hoped for in the improvement of present antiquated meth-

ods and for the introduction of other fields of agricultural activity which will approximate the needs of home consumption and reduce importation, thus saving for the Islands capital that can be better employed in the further extension of their industries.

The Manila Observatory and the display of storm signals were during the early days of occupancy conducted by the Captain of the Port.

The Weather Bureau was established by act of May 22, 1901, wherein the details of its organization were prescribed and certain stations were designated. Since that time the service has been considerably extended and additional stations have been installed. The Bureau is required to print and distribute daily reports of weather conditions, together with its forecasts. The seas about the islands have been long known to navigators as the breeding place of typhoons and timely warnings of their approach given by the Bureau are of inestimable value to shipping interests.

The act of October 2, 1901, created a Bureau of Non-Christian Tribes (now called Ethnological Survey for the Philippine Islands), for the study and advancement in civilization and material prosperity of those inhabitants of the Islands who may yet be said to be in a savage or semi-civilized state. Reference to the chapter herein entitled "Native tribes" will demonstrate to some extent at least the wide scope of the work to be performed by the Bureau and the great value upon political and economical conditions any success attendant upon its efforts will have.

There are vast tracts of public domain in the Philippines, rich in soil, mineral deposits, and rare timber, and aggregating approximately in extent 70,000,000 acres. To exploit and open up to civilization and useful pursuits these areas the Commission by act dated September 2, 1901, established a Bureau of Public Lands, to have complete control thereof, except where especial authority and duties devolve upon the Bureaus of Mining and Forestry. All instruments for the sale or conveyance of these lands are executed by the Bureau.

By act of July 1, 1901, a Biological Laboratory, a Chemical Laboratory, and laboratories for the production of vaccine virus and of serums and prophylactics were established and a Superintendent of Government Laboratories to administer the same was appointed. These laboratories are required to conduct scientific investigations and researches into matters which may be assigned them by the Commission and to make analyses and reports of the results thereof upon request from other Departments acting within the scope of their duties.

As early as June 26, 1899, orders were issued consolidating the Bureaus of Patents, Copyrights, Trade and Industrial Marks, and Designs and Models, which had been operated by the Spanish Government separately, into a single Bureau designated "Office of Patents, Copyrights, and Trade-Marks." Under the treaty of Paris the protection granted by Spain to inventors, writers, and those engaged in manufactures and trades was continued, and it devolved upon this Bureau to col-

late and arrange a proper record of the same and enforce the reciprocal duties of the grantees. War Department instructions likewise extended to persons holding letters patent, copyrights, or certificates of registration of trade-marks the same protection in the Philippines as enjoyed in the United States upon the registration of such letters in the Philippines. Many have availed themselves of this additional privilege. The cost of registration is but \$1 and is simply intended to cover the expense of issuing the certificate. This latter fact is an evidence of the different policies actuating the former and the present systems of patent and kindred law. The Spanish law, while it contemplated the protection of inventors and others, nevertheless made the Government an active participant in all profits in an increasing scale. The American system but contemplates that each claimant establish his right under beneficent laws to enjoy the profits of his creation and is content to do without revenue.

The Philippine Civil Hospital was provided for by act of October 1, 1901, and was established primarily for the care of public employees, though emergency cases of all kinds are received. A uniform charge of \$1 per day is made for entrance to the wards, but persons who desire to pay for private rooms may do so.

The Department of Commerce and Police comprehends the following Bureaus and Offices: Bureau of Post-Offices, Bureau of Coast and Geodetic Survey, Civil Supply Store, Bureau of Philippines Constabulary, Bureau of Prisons, Bureau of Coast Guard and Transportation, Office of the Captain of the Port, and the Bureau of Engineering.

The post-offices first established in the Philippines were treated as stations of the San Francisco office, and the expenses thereof, to May 1, 1899, paid from appropriations made by the Congress of the United States. The receipts to that date, aggregating \$29,439.03, were turned into the Treasury of the United States. During this early period it was the policy to establish regular offices with an experienced American in charge wherever the amount of business justified the expenditure. At the smaller military posts a soldier was designated by the military commander to handle the mail and the sale of stamps. Soldiers so detailed received no additional compensation. The mails between inter-island ports are carried under the Spanish law requiring all steamers not under contract and running on set schedules to carry the mails free of charge. The mails are also carried on the Manila and Dagupan Railway, and by the Quartermaster's Department of the Army. The service as at present operated is administered by a Director of Posts, with a general executive office and various constantly increasing post-offices and stations as the service is extended. All revenues are paid into the Insular Treasury and expenditures met from appropriations therefrom.

The postage rate of 1 cent, gold, per half ounce instead of 2 cents per

ounce on letters to island points, adopted soon after American occupation, is continued. With this exception United States postage rates and conditions prevail.

The revenues and expenditures since May 1, 1899, are as follows:

Fiscal year—	Revenues.	Expenditures.	Excess.	Deficit.
1899.....	\$42,954.87	\$30,410.75	\$12,544.12	-----
1900.....	104,282.54	89,149.51	15,133.03	-----
1901.....	122,816.83	159,028.51	-----	\$36,211.68
1902.....	138,714.05	174,935.62	-----	36,221.57
Total.....	408,768.29	453,524.39	27,677.15	72,433.25

This leaves a net deficit of \$44,756.10, which would be reduced had the service been operated independently from August, 1898. At all events it has cost the Philippine Government but a yearly average of \$11,189.03 not only to maintain but to initiate and equip a modern postal service.

The Secretary of the United States Treasury under date of January 22, 1900, in response to a Senate resolution, urged the immediate necessity for coast and geodetic surveys in the Philippine Archipelago. A Bureau was accordingly established and, though conducted as a sub-office of the United States Coast and Geodetic Survey, it is under the jurisdiction of the Secretary of Commerce and Police for administrative purposes and receives its support from the Insular Treasury. It has already accomplished many important surveys.

A supply store, under the direction of the Chief of the Constabulary forces, was established by act of September 27, 1901, to procure for and furnish the employees of the Civil Government outside of the city of Manila food supplies and other necessities at reasonable prices.

The act of July 18, 1901, created and established the Philippines Constabulary in its present form. It was organized for the purpose of better maintaining peace, law, and order in the various rural districts of the Islands. Its utility has been demonstrated in active and efficient service. By the provisions of an act dated February 2, 1903, the Civil Governor may, when in his opinion conditions warrant, direct inspectors of provinces to take charge of the jails of their respective provinces.

By amendatory act the Constabulary was authorized to operate the military telegraph and telephone lines when their use was discontinued by the United States Army. The operators in most of the offices are enlisted men of the Army or discharged soldiers. Schools for the instruction of Filipinos in telegraphy have, however, been opened.

The Bureau of Coast Guard and Transportation was organized by authority of an act of October 17, 1901. It now repairs and operates and will eventually construct its own vessels, supervises the illumination, inspection, and maintenance of light-houses, buoys, beacons, light vessels, seamarks and their appendages, and repairs and constructs the

same. The number and class of lights is being extended to keep pace with the expansion of maritime and interisland intercourse. It also has charge of all matters pertaining to official transportation of persons and freight and coöperates with the Department of Posts in the carrying of mails.

During the early days of occupancy duties of a wide and varied nature developed upon the office of the Captain of the Port. In fact, with the exception of the collection of customs revenue, its duties covered all matters of a maritime nature. Certain of these duties have been absorbed by the Customs Service and others by special Bureaus created for the purpose. The office, however, retains many duties of a police nature. The duties of captain of the port at all ports are now exercised by the collectors of customs in addition to their other duties.

A Bureau of Engineering, to have charge of any reconnoissances, examinations, surveys of rivers and harbor improvements, the construction of sewers, waterworks, and other public works requiring engineering skill, except the construction of public buildings, was established by act of January 8, 1903.

The following Bureaus and Offices are grouped under the Department of Finance and Justice: Bureau of the Insular Treasury, Bureau of the Auditor, Bureau of Customs and Immigration, Cold Storage and Ice Plant, Bureau of Justice, and the Bureau of Internal Revenue.

Immediately after the capitulation of the Spanish forces in Manila the commanding general of the invading army designated an officer to receive and receipt for public funds. Executive order of May 11, 1899, provided for a Treasurer of the Philippine Archipelago, to whom all moneys of whatever nature and derived from whatever source were to be paid in and on whom duly authenticated warrants should be drawn against authorized allotments or appropriations necessary to meet the public expenditures.

At the same time that a Treasurer was first named an officer of the Army was detailed to scrutinize, examine, and make proper record of all accounts of receipts and disbursements which the agents of the Military Government were required to render. As early as September 15, 1898, detailed instructions as to the manner of rendering accounts were issued to fiscal agents. Little change was made from those instructions until the promulgation of executive order of May 11, 1899, which provided in detail an accounting system and defined the duties and relative status of the offices which were established to regulate it. By virtue of this order a civilian Auditor and assistants were soon named. These regulations continued in force till the enactment of regulations amendatory published under authority of the President dated February 23, 1901. These regulations confer upon the Auditor duties and authority corresponding in great measure to those of the several Auditors and the Comptroller of



the United States Treasury. The system of appropriations and allotments as now in force differs somewhat from that provided as above, but in the main the accounting system has not since been altered. It is similar in character to the regulations established by the War Department in Cuba and Porto Rico and has proven to be businesslike, rigid, and exact. The Auditor submits to the Secretary of War an itemized statement of each account audited and such statements are collected and prepared in statistical form by the Bureau of Insular Affairs.

The custom-house at Manila was opened by the Military Government on August 20, 1898. In anticipation of the occupation of Manila a translation of the Spanish tariff and regulations in force in the Islands had been prepared in Washington, and these were continued in force until November 15, 1901, when the new tariff enacted by the Philippine Commission became effective. (See chapter on Tariff.)

The insurrection greatly retarded the progress of commerce; nevertheless, there have been already opened to trade six principal ports of entry, two more than had Spain during three hundred and seventy-nine years of power. The customs receipts of the Islands comprehend by far the greater proportion of Government revenue, and, in view of former lax methods and of the difficulties under which the service has labored, its freedom from speculation and scandal is gratifying.

The enforcement of the immigration laws at present devolves on the Customs Service, which is charged with the vexatious question of Chinese immigration as well as with the regulation of a large number of immigrants of different nationalities.

Under date of December 10, 1901, and by virtue of an act of the Philippine Commission a Bureau of the Cold Storage and Ice Plant was established. The erection and equipment of a plant was accomplished at an approximate cost of \$700,000. It manufactures ice, sterilizes drinking water, and provides cold storage for such perishable products as may be rightfully deposited with it.

The Bureau of Justice is under the direction of an Attorney-General and its functions will be more definitely treated of in the chapter herein entitled the "Judiciary and laws."

The first collections of internal revenue under military administration were made on August 21, 1898, when an officer of the Army was designated to act as collector for Manila and the suburbs occupied by American forces. Collections have shown a steady and decided increase on account of the extension of the field covered and the increase of business at the trade centers incident to more prevalent conditions of order.

There are four principal sources of income from internal taxation, as follows:

Industrial tax—a fixed tariff on the exercise of all industries, trades, professions, and arts.

Urbana tax; a tax of 5 per cent on 75 per cent of the declared rent of building, or, if no rent is received, the yearly rental being considered as 10 per cent of the value of the building. (Repealed.)

Sale of stamps; for negotiable paper, receipts, fines, and stamped paper and loose stamps for certain legal documents and records.

Sale of cédulas; issue of a sort of paper of identification or domestic passport which during the Spanish régime amounted to a poll tax. Their issue was discontinued for a time, but the people, who attached great importance to their holding, influenced a resumption of sales. They are now issued at a uniform rate of 1 peso each.

The establishment of districts for the collection of internal revenues has been coëxtensive with the occupation of territory by the troops. In some instances, however, and in districts devastated by the insurgents some laxity has been countenanced in the enforcement of regulations. An act of February 6, 1901, requires provincial treasurers to act as collectors for their respective provinces under the direction of the Collector for the Islands.

The following Bureaus come within the jurisdiction of the Department of Public Instruction: Bureau of Public Instruction, Bureau of Statistics, Bureau of Archives, Bureau of Public Printing, and the Bureau of Architecture and Construction of Public Buildings.

A municipal school system for the city of Manila was early established and a superintendent for the same appointed. Until March 30, 1900, there was no general supervision of the Islands school system, but on that date an officer of the Army was temporarily detailed to assume general supervision, and the superintendent of the schools of Manila was relieved of the duty of distributing to other municipalities such schoolbooks and supplies as were received from the United States. After the accession of civil administration a systematic plan of educational promotion was formulated and put in operation by the establishment, under date of January 21, 1901, by act of the Philippine Commission, of a Bureau of Public Instruction under the direction of a General Superintendent. To this Bureau are not only assigned the common but the special schools maintained by the Government.

A Bureau of Statistics was created by act of September 26, 1900, to superintend and direct the collection, compilation, and publication of such statistical information concerning the Philippines as may be required by law, and to perform such other like duties as might be required by proper authority.

A Bureau of Archives, to have charge and custody of such public documents as might in accordance with law be deposited with it, was provided for by act of October 21, 1901.

General Merritt took with him a printing outfit, which was operated by the Quartermaster's Department with considerable success. To the print-

ing apparatus were early added a binding machine, ruling machine, and an outfit for the making of rubber stamps. An act of November 7, 1901, provided for a Bureau of Public Printing. As now operated the plant, approximating in cost \$150,000, has a full complement of the various and necessary presses and modern labor-saving machinery. Each piece of machinery is separately geared and fitted with an electric motor, and an independent power plant is provided.

An act of October 18, 1901, created a Bureau of Architecture and Construction of Public Buildings to have charge of the construction and repair of public buildings.

In addition to all of the foregoing there are the following important Bureaus independent of the principal Departments of Government: The Insular Purchasing Bureau, the Philippine Civil Service Board, and the Board for the Improvement of the Port of Manila.

By act of July 16, 1901, the office of the quartermaster for Civil Bureaus was discontinued and an Insular Purchasing Agent instituted instead, to whose Bureau the clerks of the former were transferred. The Bureau makes extensive purchases of supplies and, upon lawful requisition, furnishes such supplies to the various Bureaus at an advance of 10 per cent on the purchase price.

On September 19, 1900, the Commission passed "an act for the establishment and maintenance of an efficient and honest civil service in the Philippine Islands," and created a Civil Service Board of three persons to prepare rules for appointments and promotions according to merit, and by competitive examinations as far as practicable.

Among the records captured in Manila was a project for the improvement of the port of Manila, under which some work extending over a considerable period of time had been accomplished. These plans were considered and to some extent revised. The Commission in continuation of the work done under the Military Government has appropriated \$3,000,000, United States currency, for such work under the direction of the Engineer Officer, Division of the Philippines. This work was specially exempted from the operation of the act dated January 3, 1903, which provided that all other works of a similar character shall be prosecuted under the direction of the Bureau of Engineering.

The supervision of the Secretary of War, required by law over the affairs of the Philippines, is conducted through the Bureau of Insular Affairs, War Department, created by act of Congress approved July 1, 1902, in continuation of the division of his office established by the Secretary.

Within limited space but little idea can be conveyed of the multifarious duties devolving on the several Bureaus, the duties of some of which have been merely touched upon in this chapter, but in most instances the subject-matter of their jurisdiction is treated with greater particularity under other and specific headings.

The first municipal elections under American supervision took place in May, 1899, after the rout of the insurgents at Baliuag, Bulacan, by General Lawton. The result of the election was announced in military orders dated May 7, 1899. In July of the same year Parañaque, Las Piñas, Bacoor, and Imus elected mayors under military protection. These elections were followed by others as speedily as conditions warranted.

The following is extracted from the instructions of the President, dated April 7, 1900, to the Philippine Commission:

As long as the insurrection continues the military arm must necessarily be supreme. But there is no reason why steps should not be taken from time to time to inaugurate governments essentially popular in their form as fast as territory is held and controlled by our troops; \* \* \* to devote their attention in the first instance to the establishment of municipal governments, in which the natives of the Islands, both in the cities and the rural communities, shall be afforded the opportunity to manage their own local affairs to the fullest extent of which they are capable, and subject to the least degree of supervision and control which a careful study of their capacities and observation of the workings of native control show to be consistent with the maintenance of law, order, and loyalty.

The next subject in order of importance should be the organization of government in the larger administration divisions corresponding to counties, departments, or provinces, in which the common interests of many or several municipalities falling within the same tribal lines, or the same natural geographical limits, may be subserved by a common administration. \* \* \* In the establishment of municipal governments the Commission will take as the basis of their work the governments established by the military governor under his order of August 8, 1899, and under the report of the board constituted by the military governor by his order of January 29, 1900, to formulate and report a plan of municipal government, of which his honor, Cayetano Arellano, president of the Audiencia, was chairman, and they will give to the conclusions of that board the weight and consideration which the high character and distinguished abilities of its members justify.

\* \* \* The many different degrees of civilization and varieties of custom and capacity among the people of the different islands preclude very definite instruction as to the part which the people shall take in the selection of their own officers; but these general rules are to be observed: That in all cases the municipal officers, who administer the local affairs of the people, are to be selected by the people, and that wherever officers of more extended jurisdiction are to be selected in any way, natives of the islands are to be preferred, and if they can be found competent and willing to perform the duties, they are to receive the offices in preference to any others.

In all the forms of government and administrative provisions which they are authorized to prescribe, the Commission should bear in mind that the government which they are establishing is designed, not for our satisfaction or for the expression of our theoretical views, but for the happiness, peace, and prosperity of the people of the Philippine Islands \* \* \*.

Pursuant to its purpose to give effect to the instructions of the President, in extending the provisions of the Provincial Government Act to those provinces of the Philippine Islands considered sufficiently pacified

for civil administration, and in compliance with notice previously given to the municipalities, the Commission made a tour of the provinces.

The provincial government is employed for two purposes: First, the collection of taxes through a provincial treasurer, and second, for internal improvements. It also supervises the police of the province and the conduct of its municipalities. In each province there is a governor who is elected by the councilors of all the municipalities of the province, a secretary, treasurer, and supervisor appointed by the Commission under the provisions of civil-service law, and a fiscal appointed without reference to such law.

The provincial board is composed of the governor, treasurer, and supervisor, with the secretary of the province as secretary of the board.

This board levies all taxes, orders improvements on the recommendation of the supervisor, and exercises generally the government of the province.

## Chapter XIV.

### THE JUDICIARY AND LAWS.

[Revised by Judge D. R. Williams.]

**Substantive laws based upon the Roman law—Spanish laws continued in force—Jurisdiction of courts—Provost courts—Courts-martial—Appeals to Supreme Court of the United States—Reorganization of courts—Jurisdiction of Courts of First Instance—Justices of the peace—Bureau of Justice—Supreme Court—Code of Civil Procedure—Notaries public—Spanish methods—Bill of Rights—Marriage laws—Civil service.**

Says Sir Henry Maine, perhaps the greatest and certainly the most interesting of modern jurist historians: "The Roman law has never ceased to be spoken of with deep respect, and it is in fact the source of the greatest part of the rules by which civil life is still governed in the Western world." But little fault has been found in the great body of the substantive law of the Philippines, an offspring of the Roman law; in fact it has been pronounced admirable by both American and Filipino jurists who have had to apply it, though the dilatoriness of its procedure became, early in American occupancy, provocative of criticism and of partial—but it is hoped for that part effectual—amendment.

Among the first acts of the Military Government was a public recognition of the law of the country and its officers, so far as they were not incompatible with the purposes of occupation. It was the intention of the military authorities, in order to prevent a lapse and consequent injury to business interests, that the courts as then constituted continue to administer the affairs of justice with only such changes as experience in their operation would seem to render necessary. This intention was, in a measure, frustrated by the judiciary itself, most of whom declined to hold court under the altered conditions, and many of whom, who were natives of Spain, began preparation for returning to their homes.

In accordance with the usages of war and to meet the necessity for some tribunal for the conservation of public peace and order certain military courts were established with defined jurisdiction. As such courts were but temporary in their nature and were intended to serve only the exigencies of a transitory and somewhat disordered period, they are treated separately and not as a part of the general jurisprudential system. The jurisdiction of these courts has passed into other and appropriate civil tribunals, but their effect has been too extended and

salutory to be ignored. Until the civil judiciary was firmly reëstablished all civil matters, as distinguished from criminal, whether public or individual, requiring judicial action were virtually held in abeyance unless they could be determined, without apparent prejudice to conflicting interests, by the military authorities. All criminal cases, however, could be handled by the military courts without injustice and with greater expedition.

A general order was issued shortly after Manila was occupied by American troops defining the constitution and limits of courts and commissions for the trial of citizens offenders, and this served as a basis of instruction respecting jurisdiction and the punishment which might be imposed.

General Orders, No. 8, Headquarters, Department of the Pacific and Eighth Army Corps, dated August 22, 1898, provided that—

The crimes and offenses triable by military commissions are murder, manslaughter, assault and battery with intent to kill, robbery, rape, assault and battery with intent to commit rape, and such other crimes, offenses, or violations of the laws of war as may be referred to it for trial by the commanding general. The punishment awarded by military commissions shall conform, as far as possible, to the laws of the United States, or of either of the States, or the custom of war. Its sentence is subject to the approval of the commanding general.

Another paragraph of the foregoing order conferred jurisdiction on provost courts to try all other crimes and offenses not exclusively triable by courts-martial or military commissions. These courts had authority to punish with confinement, with or without hard labor, for a period not more than six months, or with fine not exceeding \$250, or both. The sentence of such courts did not require the approval of the commanding general, but might be reviewed by him and was subject to his remission or mitigation. Both a superior and an inferior provost court were established in Manila, with jurisdiction defined as to classes of cases which might be tried by them, respectively. The provost court followed the progress of the American arms throughout the Islands and until some time after municipal governments were formed; all fines collected were paid into the general treasury and a separate account of the same kept. The jurisdiction of such courts throughout the provinces was extended to cover all crimes not of a capital nature with a corresponding increase of the penalties which might be imposed. The military commanders in the field were authorized to designate such courts at points within their discretion. It was found necessary in some instances to confer on the provost courts certain jurisdiction in civil matters that the business of the cities might be transacted. The procedure of these courts was directed to conform to that of summary courts of the United States Army, and, while informal in character, was obliged to respect rights of persons accused.

Courts-martial subject to restrictions of the law and precedents of the service are from time to time constituted for the trial of offenders connected with the military service of the United States.

The highest appellate jurisdiction over matters judicial is vested in the Supreme Court of the United States by section 10 of the Act of Congress approved July 1, 1902, as follows:

That the Supreme Court of the United States shall have jurisdiction to review, revise, reverse, modify, or affirm the final judgment and decrees of the Supreme Court of the Philippine Islands in all actions, cases, causes, and proceedings now pending therein or hereafter determined thereby in which the Constitution or any statute, treaty, title, right, or privilege of the United States is involved, or in causes in which the value in controversy exceeds twenty-five thousand dollars, or in which the title or possession of real estate exceeding in value the sum of twenty-five thousand dollars to be ascertained by the oath of either party or of other competent witnesses, is involved or brought in question; and such final judgments or decrees may and can be reviewed, revised, reversed, modified, or affirmed by said Supreme Court of the United States on appeal or writ of error by the party aggrieved, in the same manner, under the same regulations, and by the same procedure, as far as applicable, as the final judgments and decrees of the circuit courts of the United States.

On June 11, 1901, Act 136, Philippine Commission, reorganized the entire administration of justice. It provided for the appointment of a Supreme Court of the Philippine Islands with a personnel of one Chief Justice and six associate justices. The court has original jurisdiction to issue writs of mandamus, certiorari, prohibition, habeas corpus, and quo warranto, and appellate jurisdiction in all actions and special proceedings properly brought before it from the Courts of First Instance.

The Chief Justice and Associate Justices of the Supreme Court are to be hereafter appointed by the President by and with the advice and consent of the Senate of the United States, and their compensation is subject to change only by the Congress. The court sits in banc with the Chief Justice presiding. Any five of the justices constitute a quorum, but the concurrence of at least four members is necessary to pronounce a judgment.

A Court of First Instance is provided for each province of the Islands, the provinces being grouped, for judicial purposes, into sixteen districts exclusive of the city of Manila. Judges of first instance are appointed by the Civil Governor of the Islands with the approval and consent of the Commission. Courts of First Instance have original jurisdiction as follows:

1. In all civil actions in which the subject in litigation is not capable of pecuniary estimation.
2. In all civil actions which involve the title to or possession of real property, or any interest therein, or the legality of any tax, import, or assessment, except actions of forcible entry into and detainer of lands or buildings, original jurisdiction of which is conferred upon courts of justices of the peace.



3. In all cases in which the demand, exclusive of interest or the value of the property in controversy, amounts to \$100 or more.

4. In all actions in admiralty and maritime jurisdiction, irrespective of the value of the property in controversy or the amount of the demand.

5. In all matters of probate, both of testate and intestate estates, appointments of guardians, trustees, and receivers, and in all actions for annulment of marriage, and in all such special cases and proceedings as are not otherwise provided for.

6. In all criminal cases in which a penalty of more than six months' imprisonment or a fine exceeding \$100 may be imposed.

7. To issue writs of injunction, mandamus, prohibition, quo warranto, and habeas corpus.

The Courts of First Instance now determine certain criminal offenses which had under Spanish régime been cognizable only by military commissions. They have appellate jurisdiction over all causes arising in justice and other inferior courts in their respective provinces.

Courts of First Instance and the Supreme Court of the Islands are courts of record, and by act of July 1, 1902, their admiralty jurisdiction may not be changed or amended except by direction of the Congress of the United States.

Courts of justices of the peace are established for each municipality and justices are appointed by the Civil Governor. Such justices do not constitute a court of record. They have original jurisdiction for the trial of all misdemeanors and offenses arising within their respective municipalities, in cases where the sentence might not by law exceed six months' imprisonment or a fine of \$100; and for the trial of all civil actions properly triable within the municipality over which jurisdiction has not exclusively been given to the Courts of First Instance, in all cases in which the demand, exclusive of interest or the value of the property in controversy, amounts to less than \$300. Justices of the peace also have jurisdiction over all actions for forcible entry into and detainer of real estate, irrespective of the amount in controversy.

By Act 496, effective February 1, 1903, the Commission established a Court of Land Registration for the Islands. This Court is described in the chapter on "Land Titles."

The Bureau of Justice is under the control and supervision of an Attorney-General, who is assisted by a Solicitor-General and Assistant Attorneys-General. These officers are required to attend the sessions of the Supreme Court of the Islands and to prosecute or defend therein all causes, civil and criminal, to which the Government, or any officer thereof, in his official capacity, is a party. They are also required to assist provincial fiscals in the discharge of their duties when the exigencies of the public service may be so subserved. In addition to duties of public prosecution and defense the Attorney-General is also charged with the preparation of drafts of contracts and other legal writings for

the several departments of government and is required when so requested to render his opinion in writing to the legislative body of the Islands, the Chief Executive, the Auditor of public accounts, the Insular Treasurer, the General Superintendent of Public Instruction, the trustee of any Government institution, and any provincial fiscal.

The Supreme Court has a clerk who is its recording officer and interpreter and translator. He is a salaried officer and the fees collected by him are turned into the general Treasury. He is allowed such assistants as the needs of his office from time to time require.

The sessions of the Supreme Court are held at Manila, but provision is also made, in the discretion of the court, for sessions at Iloilo and Cebú. While sitting in the city of Manila the sheriff of that city is the officer upon whom devolves the duty of serving its process, and he has the power to appoint as many deputies as he may deem expedient. In Manila the sheriff and his deputies are salaried officers, all fees collected being turned into the Treasury. In the provinces the officer acting as sheriff and his deputies are paid by fees only. When the court is sitting elsewhere than in Manila the governor of the province in which the court is for the time being in session becomes the officer who serves its process, and a governor when so acting is entitled to designate his necessary deputies.

To each Court of First Instance is assigned a provincial fiscal who is charged with the duty of representing the provincial and insular governments in the court of his province in all actions of prosecutions to which such governments may become a party. Each court is allowed a clerk with such assistants as may be fixed by the Supreme Court. The governors of the respective provinces, and for Manila the sheriff thereof, are the officers required to serve the process of the Courts of First Instance.

Justices of the peace receive no fixed compensation. They may act as their own clerks, but if the volume of their business and their fees justify they are allowed to engage a clerk or amanuensis. Their process may be served by the officers or their deputies, who are required to serve the process of the Supreme Court and Courts of First Instance, or by any bailiff appointed by the justice for that purpose or by any policeman of the municipality.

Chapter II of an act of the Philippine Commission entitled "An act providing a code of procedure in civil actions and special proceedings in the Philippine Islands," regulates the admission of applicants to the bar and defines the duties of attorneys. Any resident of the Philippine Islands, not a subject or citizen of any foreign Government, of the age of 23, of good moral character, and who possesses the necessary qualifications of learning and ability, is entitled to admission as a member of the bar and as such eligible to practice in all the courts of the Islands. Examinations are held subject to the supervision of the Supreme Court. Persons who have been admitted to practice before

any of the Federal courts of the United States or before the highest court of any of the States or territories thereof are required, in order to practice before Philippine courts, to pass an examination upon the subjects contained in the Civil Code, Penal Code, and the Code of Commerce in force in the Islands. An attorney may be disbarred from practice for misconduct by the Supreme Court only, after he has had full opportunity to answer complaints made against him. Distinction among the grades of attorneys has been discontinued and the offices of procuradors and solicitors under the Spanish régime have been abolished.

Judges of First Instance must appoint at least one notary public for each municipality in their respective provinces and may appoint as many more as they consider the public good requires. These notaries exercise the duties usual to their office.

There has been some little agitation as to the advisability and even the practicability of engrafting on the present procedure of the Islands the English common-law jury system. Whether that system can be successfully made a part of a jurisprudence in which it has hitherto had no part remains to be determined.

"There is no history so long, so continuous, and so authentic as that of the Roman law" from which the Philippine law as a heritage from Spain can be traced. No useful discussion of the substantive law could be confined within the scope and purport of this chapter. Suffice it to say that it remains changed only in details by specific legislative enactment, foremost among which is an almost entire revision of its methods of procedure.

Under Spanish methods the prisoner charged with crime had slight opportunity to make intelligent defense, and little liberty of action or decision while undergoing prosecution, which the laws, permitting delays, might extend almost indefinitely. During the early days of occupancy, when criminal matters were being administered by the military courts, the need of corrective measures was not keenly felt, but upon the resumption of their entire duties by the civil courts a code of criminal procedure was promulgated by the Military Governor. This code is based upon the expedition of public business and at the same time a due regard for the personal rights of the accused. The Civil Code has undergone some important but less sweeping changes.

The English-speaking peoples have ever jealously guarded their individual liberties and have when time and occasion demanded vigorously asserted what they believed to be their inalienable rights. The spirit present at Runnymede when the English obtained from a reluctant and ambitious King a recognition and public affirmation of those rights was also present in the Constitutional Convention. The late and lamented President of the United States assured to the Filipinos those same rights. To quote the words of Mr. McKinley:

At the same time the Commission should bear in mind, and the people of the Islands should be made plainly to understand, that there are certain great prin-

ciples of government which have been made the basis of our governmental system which we deem essential to the rule of law and the maintenance of individual freedom, and of which they have, unfortunately, been denied the experience possessed by us; that there are also certain practical rules of government which we have found to be essential to the preservation of these great principles of liberty and law, and that these principles and these rules of government must be established and maintained in their islands for the sake of their liberty and happiness, however much they may conflict with the customs or laws of procedure with which they are familiar.

It is evident that the most enlightened thought of the Philippine Islands fully appreciates the importance of these principles and rules, and they will inevitably within a short time command universal assent. Upon every division and branch of the government of the Philippines, therefore, must be imposed these inviolable rules:

That no person shall be deprived of life, liberty, or property without due process of law; that private property shall not be taken for public use without just compensation; that in all criminal prosecutions the accused shall enjoy the right to a speedy and public trial, to be informed of the nature and cause of the accusation, to be confronted with the witnesses against him, to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defense; that excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishment inflicted; that no person shall be put twice in jeopardy for the same offense, or be compelled in any criminal case to be a witness against himself; that the right to be secure against unreasonable searches and seizures shall not be violated; that neither slavery nor involuntary servitude shall exist except as a punishment for crime; that no bill of attainder or ex post facto law shall be passed; that no law shall be passed abridging the freedom of speech or of the press, or the rights of the people to peaceably assemble and petition the Government for a redress of grievances; that no law shall be made respecting an establishment of religion or prohibiting the free exercise thereof, and that the free exercise and enjoyment of religious profession and worship without discrimination or preference shall forever be allowed.

These instructions are incorporated in the various laws enacted by the Commission acting thereunder. Such a complete change of fundamental principles can best be appreciated by Filipino posterity, who should regard Mr. McKinley as their benefactor and his instructions as a sacred heritage to be enjoyed, fostered, and protected.

Much complaint was heard relative to the then existing Spanish law regarding matrimony on account of the attendant expenses which, it was claimed, influenced concubinage, or copartnership not valid by law. The salient features of the law operative December 18, 1899, regulating this status, are as follows: Fixing of age of consent of male at 14 years, and of female at 12, and requiring consent, in case of minors, of the father or natural guardian; declaring certain marriages incestuous and void; allowing marriages to be solemnized by either a judge of any court inferior to the Supreme Court, justice of the peace, or priest or minister of the gospel of any denomination; declaring want of form not to invalidate marriage ceremonies performed theretofore in good faith; and providing for the annulment of marriages void ab initio.

One of the most important duties performed by the Commission under instructions of the President was the promulgation of a civil-service law comprehending within its operation almost every position under the Central Government, the provincial governments, and the government of the city of Manila. The civil service of the Philippines is separate and distinct from that of the United States, although provision is made by law for transfer to the former from the latter and by civil-service rules from the latter to the former. Competitive civil-service examinations in the Philippines are open under present statutes to the following persons over 18 and under 40 years of age:

- (a) Citizens of the United States;
- (b) Natives of the Philippine Islands;
- (c) Persons who have, under and by virtue of the treaty of Paris, acquired the political rights of natives of the Philippine Islands;
- (d) Persons who have taken the oath of allegiance to the United States and served as members of the Army or Navy of the United States, and been honorably discharged therefrom.

Examinations with a view to securing eligibles for appointment to the Philippine civil service are held throughout the Islands under the supervision of the Philippine Civil Service Board, and in the United States by the United States Civil Service Commission under authority of the Philippine civil-service law and Executive Order of the President.

The following schedules show the methods of entrance to the various positions in the different branches of the Philippine service:

*Schedule A.*—All positions, principally clerical, not included in the following schedules, filled by employees of whatever designation, who are compensated by a fixed salary or otherwise, in all Offices and Departments of the Central Government of the Philippine Islands, in the provincial government service, and in the municipal service of Manila. The positions and employments included in this schedule are classified, and vacancies therein not filled by promotion, reduction, transfer, or reinstatement shall be filled by competitive examination.

*Schedule B.*—Professional, technical, and scientific positions, including all such employees of whatever designation, whether compensated by a fixed salary or otherwise. The offices and positions in this schedule are classified, and vacancies therein if not filled by promotion, reduction, transfer, or reinstatement shall be filled by selections from certifications of eligibles secured by competitive or non-competitive examination, as the Civil Service Board may determine, to meet the needs of the service. This schedule includes positions for which registers of eligibles are not ordinarily maintained and in which vacancies occur less frequently than in those of the preceding schedule. Examinations for these positions are held only when eligibles are needed. No complete list of such positions can be furnished, as it is impossible to predict in what positions vacancies may occur. Below there follows a partial list:

Chemist; assistant chemist; chemist and food analyst; chemist and investigator; agricultural chemist; physical chemist; analytical chemist; physiological chemist; pharmacologist; laboratory assistant; pharmacist; assistant bacteriologist; pathologist; assistant pathologist; assistant biologist; geologist;

mineralogist; entomologist; municipal physician; house physician; anatomical artist; director of serum institute; director of vaccine institute; medical inspector; director of experiment station, Bureau of Public Health; forestry inspector; assistant forestry inspector; forester; assistant forester; manager timber-testing laboratory; instrument maker; superintendent of experiment station, Bureau of Agriculture; agricultural explorer; fiber expert; horticulturist; botanist; sugar culturist; manager of stock farm; expert in animal husbandry; veterinary inspector; veterinary surgeon; additional deputy customs collector; customs appraiser; deputy customs surveyor; appraiser of textiles; admeasurer; special agent; cashier; civil engineer; mechanical engineer; architectural draftsman; mechanical draftsman; topographical draftsman; junior draftsman; sanitary engineer; provincial supervisor; copyist or tracer of drawings; electrician; observer, Coast and Geodetic Survey; computer; photographer; law clerk; editorial clerk; librarian; engraver; boiler inspector; harbor master; provincial treasurer; superintendents; inspectors.

*Schedule C.*—Positions of skilled workmen, mechanics, or artisans. These positions are classified under Clause (b), section 6 of the Civil Service Act. Examinations given for these positions are generally noneducational and noncompetitive in character. Each applicant is required to complete and submit on Form No. 35 evidence of his age, character as workman, experience, and physical condition, these elements composing the examination. No educational test or practical questions are given except for certain trades and technical or skilled occupations, such as printer, mechanical engineer, electrician, etc., the examinations for which are generally competitive. Watchmen in Class C, or below, and teamsters in Class B, or below, are treated as skilled workmen, in that the examination for these positions is noneducational and noncompetitive. Following is a partial list of positions vacancies in which are filled by noneducational examination, as provided in Form No. 35:

Baker; blacksmith; blacksmith helper; cabinetmaker; canvas worker; carpenter; cranesman; assistant cranesman; dredge engineer; dredge inspector; dynamo tender; engineer helper; engineman; fireman; foreman and assistant foreman, except in the Bureau of Public Printing; gardener; gas fitter; hardwood finisher; harness maker; horseshoer; assistant inspector; light-house keeper; lineman; lock expert; machinist; assistant machinist; market collector; mason; master and pilot; master of launch; master of lorchas; master mechanic; master workman; mate of launch; matron; mechanic; money counter; molder; oiler; overseer; assistant overseer; packer; painter; pilot; pipe fitter; plumber; prison keeper; rodman; sailmaker; sheet iron worker; steam engineer; assistant steam engineer; steam engineer and machinist; steam fitter; assistant storekeeper; superintendent of corral; teamster; tinsmith; watchman; wireman; wood worker; wheelwright.

*Schedule D.*—The Executive Secretary; the members of the Civil Service Board; the Insular Purchasing Agent; the Chief of the Forestry Bureau; the Chief of the Mining Bureau; the Chief of the Bureau of Agriculture; the Chief of the Bureau of Public Lands; the Chief of Coast Guard and Transportation; the Director of Posts; the Assistant Director of Posts; the Postmaster at Manila; the Chief of Philippines Constabulary; the Collector of Customs for the Philippine Islands; the Deputy Collector of Customs for the Philippine Islands; the Surveyor of Customs for the Philippine Islands; the Cashier of the Collector of Customs for the Philippine Islands; the collector of customs at Iloilo; the collector of customs at Cebu; the Collector of Internal Revenue for the Islands; the General Superintendent of Education; the Chief of the Bureau of Public Printing; the Chief Statistician; the Chief of the Bureau of Archives; the Chief

of the Bureau of Architecture; the Chief of the Fire Department of Manila; the City Assessor and Collector of Manila; the Chief of Police of Manila; the chief or head of any bureau hereafter organized, unless otherwise expressly provided by law. Vacancies occurring in said offices shall be filled without examination, as provided in the Civil Service Act, from a class to be composed of all the first, second, and third assistants in such offices, the intention of this provision being that the appointing power may, by virtue hereof, transfer from one office to another a person deemed competent to fill a vacancy.

*Schedule E.*—One private secretary to the Civil Governor and to each member of the Philippine Commission, except the President; persons appointed by the Civil Governor, by and with the advice and consent of the Philippine Commission, unless otherwise specifically provided by law; any person in the military or naval service of the United States who may be detailed for the performance of civil duties; all persons employed merely as laborers and all employees whose rate of compensation is \$120 or less per annum; the members of the Board of Health for the Philippine Islands; the presidents of provincial boards of health; the Director of the Agricultural College and Experiment Station; the Director, the three assistants, and the secretary of the Weather Bureau; the Chief of the Ethnological Survey; the Superintendent and directors of Government Laboratories; the Attending Physician and Surgeon of the Philippine Civil Hospital; postmasters compensated on a percentage basis as provided by law; postmasters and customs inspectors in the provinces whose rates of compensation do not exceed \$300 and \$180 per annum, respectively, who may lawfully perform the duties of postmaster and customs inspector in connection with the official duties with which they are charged, if they be Government employees, or if not Government employees, in connection with their private business, such duties requiring only a portion of their time; the Consulting Engineer to the Commission; the Officer in Charge of the Improvement of the Port of Manila; detectives; any position in the Department of Commerce and Police the duties of which are of a quasi-military or quasi-naval character, and for the performance of which duties a person is commissioned or enlisted for a term of years; judges and justices of the peace; the Attorney-General and his assistant lawyers; the Solicitor-General; the Assistant Attorney-General; the Supervisor and Deputy Supervisor of Provincial Fiscals; provincial fiscals; the Auditor of the Philippine Islands; the Deputy Auditor of the Philippine Islands; the Treasurer of the Philippine Islands; the Assistant Treasurer of the Philippine Islands; the Superintendent of the Insular Cold Storage and Ice Plant; secret agents. Of the city of Manila: The members of the Municipal Board; the City Engineer; the City Attorney and his assistant attorney; the Prosecuting Attorney and his assistant attorneys; the sheriff and his deputies. These positions and employments are not at this time classified, but it is expected that during the year many of them will be placed in the classified service. "It is the purpose of the appointing power to observe the principle of promotion in filling vacancies in the unclassified service, provided that competent persons may be found in the service who are available and possess the qualifications required."

On and after September 1, 1903, all appointments in the city of Manila to the position of teacher, and in the Philippine Islands to the position of teacher of English, are to be made as a result of competitive civil-service examination.

## Chapter XV.

### EDUCATION.

[Revised by A. R. Hager.]

Educational conditions on arrival of Americans—Spanish schools—List of private schools in Manila—Early operations under military supervision—Organization — Division superintendents — American teachers — Enrollment in schools—Normal schools—Manila—Secondary schools—Normal institutes—Dialects or Spanish vs. English as medium of instruction—Industrial education — Trade schools — Nautical schools — Agricultural schools — School-houses—Igorrotes—Moros.

The development of the present American educational system in the Philippines has been much more rapid than could have been foreseen.

When the Army entered Manila on August 13, 1898, the newly arrived Americans found the city provided with about thirty primary schools. These had been conducted by Filipino teachers, most of whom were graduates of the Manila (Spanish) Normal School. Beside these primary schools there were a number of secondary and commercial schools, and faculties of law, medicine, and divinity of the University of Santo Tomas, all of which were under the direction of the church.

The following is a list of those schools which still exist, augmented by a few others established since the American occupation, as the Liceo de Manila and the Instituto Filipino:

#### *Private schools, Manila.*

School.	Teachers.	Pupils.
<b>BOYS' SCHOOLS.</b>		
Ateneo de Manila .....	24	1,200
Escuela Normal de San Francisco Javier .....	18	630
Universidad de Santo Tomas .....	68	342
Colegio Filipino .....	35	1,500
Liceo de Manila .....	33	1,745
Colegio Mercantil .....	8	261
Instituto de Manila .....	13	200
Instituto Filipino .....	17	280
Colegio de San Beda .....	10	250
Colegio de San Juan de Letran .....	30	980
San Augustin Colegio de Niños .....		
<b>GIRLS' SCHOOLS.</b>		
Colegio de Beaterio de la Compañia de Jesus .....	8	95
Colegio de Santa Isabel .....	13	430
Colegio de Santa Rosa .....	8	242
El Asilo de S. Vicente de Paul .....	12	160



Other schools for girls in Manila are the Instituto de Mujeres, Escuela Catolica de la Conferencia de Nuestra Señora de Lourdes, Colegio de la Inmaculada Concepción, and Colegio de Santa Catalina.

A nautical school was maintained, and an industrial and trade school had been closed a short time before the arrival of our troops.

On the 1st of September, two weeks later, the schools were opened by order of the commanding general of the American forces. In nearly every case the Filipino teacher was continued in charge of his school and, according to custom, the school was the domicile of the teacher.

The plan first pursued was one of expediency. Instruction was carried on as before, in Spanish, though before the following June there were seven teachers of English. Two of these were ladies, the others being detailed for the purpose from the Army. The American teacher has from the start found his work necessarily divided between the native teachers and the pupils. The Filipino teachers have devoted themselves to the study of English, and while the younger students have the better chance to attain proficiency in the language, yet one will find to-day a number of men and women teaching English in the public schools of Manila who were teaching there long before American occupation. Since 1860, when the public-school system of the Philippines was inaugurated by Señor O'Donnell, the progressive Spanish minister of foreign affairs, nearly every pueblo<sup>1</sup> all through the provinces has had its schools, one for boys and one for girls. These schools, owing partly to their distance from remote portions of the barrios<sup>2</sup> and partly because of fees charged by the teachers for books and tuition, reached a small proportion of the population.

The first two years of American occupation saw a gradual increase in the amount of English taught, though the work was greatly hindered by lack of suitable text-books and appliances. In Manila, beside the primary schools mentioned, the Ateneo (with primary, secondary, and commercial courses), the High Normal School, and the Girls' Municipal School were also under Government supervision. These are church schools, the Ateneo and the Normal being Jesuit schools, and the Girls' Municipal School a Government school taught by the Spanish Sisters of Charity. While these schools were supported by the Government and nominally under Government direction for the first two years after American occupation, yet little effort was made to direct or change the character of their work.

No attempt at general supervision of education throughout the Archipelago was made by the Military Government until 1900, when Capt. Albert Todd was detailed to this work by General Otis. Books and other supplies were distributed and reports regarding school conditions in the

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<sup>1</sup> Township or town.

<sup>2</sup> Subdivision of township. The term "barrio" is also often used to denote a small village.

various military districts of the Archipelago were called for from the officers in charge.

Mr. David Gibbs, an American school-teacher, writing in the Outlook for May 30, 1903, under the caption of "Soldier Schools in the Philippines," says:

It does not appear to be generally known that our Army, soon after a captured town or district had become sufficiently quiet, established public schools for the Filipino children, purchased and distributed school supplies, gave financial aid to poor towns, and detailed soldiers and others as teachers, who instructed the native teachers and the children in English. These facts have been set forth in the official reports of the Military Governor and the General Superintendent of Public Instruction of the Islands, but have not received the public attention they deserve. Throughout the Islands schools were established and taught or supervised by soldiers. President Roosevelt, in his Memphis speech said: "The American Army in the Philippines showed, as a whole, not only splendid soldierly qualities but a high order of humanity in dealing with their foes."

The story of the establishment of the soldier schools as one of the ways in which this spirit of humanity of which the President speaks was expressed is thus briefly told in the following letter from General Otis: "The primary schools established in the Philippines while the Army exercised supervision of the affairs had their start in Manila shortly after our occupation of the city. The natives expressed a desire to have schools for their children, and I directed the provost-marshal, General Hughes, to consider the subject, and to report what, in his opinion, might be accomplished with facilities on hand and attainable. As a result of his investigation we detailed a soldier, Mr. G. P. Anderson, who had experience in the common schools in the United States, to take immediate charge of the elementary education in Manila. We reopened all the old school buildings and some others. We employed as teachers those formerly holding such positions, of whom the greater number were females, also Americans and others supposed to be competent to teach, and detailed soldiers, when available, to assist them. We exhausted all text-books in Manila received from the Spanish Government and purchased many others. The schools were very successful. Subsequently similar schools were organized in cities and towns very soon after Aguinaldo's soldiers had been driven out. The work was carried out through correspondence and report, and not through any prescribed general regulations. The orders issued from Manila headquarters were merely those detailing a superintendent, directing the detailing of soldiers as teachers, or for the purchase of books."

The official records of these schools are very incomplete, so that the number of soldiers serving as teachers is not known, but the number of schools organized and that the attendance was large, as already indicated. The Military Governor states that \$104,251.87 was expended from the public civil funds for the purchase of school books and supplies, and that a greater part of these, together with those received from the Spanish Government, was distributed throughout the Islands. Although some of these supplies were inferior in quality, they were much better than those formerly in use under Spanish rule, and were of valuable assistance in securing later, under civil rule, more efficiently organized work.

In northern Luzon there were 479 schools; in southern Luzon, 89; in Panay, 210; in Negros, 59; in Cebu, 23; in Mindanao, 45. Dr. Atkinson, in his last report as General Superintendent of Public Instruction to the Commissioner of Education of the United States, commends the success of the schools of northern Luzon, of Cebu, and of Mindanao. In southern Luzon, Panay, and other Visayan islands the soldier schools of this section of the Archipelago

were numerous, well attended, and important. In the section of central Luzon, including the old fighting provinces of Pampanga, Bulacan, and Bataan, these schools have long been in operation and were very important in securing the good will of the people and in forming a basis for the present system of instruction. In Pampanga 14 schools were reported, but this did not include all the schools, nor those of Bulacan and Bataan. In Bataan there were schools in every important town, although attendance was not compulsory. Many schools were very poorly supplied, and the work done in them was not often of excellent quality. Yet, however poorly equipped and taught, the establishment of these 1,000 schools, with an attendance of about 100,000 children for a year or more before the present Department of Public Instruction was established, must have been of very great assistance in securing the present very successful status of this Department with its 1,838 schools and 200,000 children.

Although these schools were not always well supervised, for the Army officers were not skilled schoolmen, yet here and there an officer gave them great attention and secured marked progress, and also occasionally some soldier developed into an excellent schoolmaster. The native teachers learned a great deal of English, so that when the American teachers came they were often able to assist in the elementary instruction in English. In one of the towns besides the public schools taught by soldiers, a private class was taught by an officer. That town furnished to the educational department last year [1902] eight efficient young teachers who could read, speak, and write English with considerable fluency and accuracy, all of whom had learned their English from the soldiers. The American teachers who went to these towns took up the work where the soldiers left it, and have continued it to its present very successful standing. The work of the soldiers, however, broke the ground. Their schools served to interest the people in the study of English and to turn their minds from warfare to education. The commanding officers everywhere emphasized the necessity of having instruction in English, recommended the securing of American teachers from the States, indicated from their experience where these teachers were most needed, and gave much other information and advice which was of the greatest possible assistance in establishing a permanent system of public instruction under civil rule.

The idea of the soldier as a schoolmaster is new in the history of warfare and of education. The honor of setting this precedent rightly belongs to the Army of a people which gives the highest place among its institutions to the public schools. How different is this picture of the soldier in the tropical schoolroom, toiling patiently with hundreds of little brown boys and girls, and instructing the native teachers that they may learn his own tongue, greeted along the street with smiles and "Hello, Maestro!" from happy little boys and girls—how different this picture from that of the soldier in the Philippines which has so long been held before the public eye: Yet there were soldier teachers in nearly every Army post in the Islands, for public schools were established in the larger garrisoned towns by the voluntary efforts of subcommanding officers, and taught voluntarily and without extra pay by soldiers detailed as teachers, in nearly every case very soon after these towns had been captured from the insurrecto army. The report of the Military Governor shows that there were more than one thousand such schools, attended by more than one hundred thousand children. This report also shows that nearly every important commanding officer was interested in this humanistic movement. This action, therefore, was not exceptional; it indicates strongly the moral tone of the Army as a whole, and shows in many hundred Army posts and throughout the Islands a kindly spirit toward the Filipino.

Further, since the arrival of the American teachers, the Army has in every way given its assistance and shown kindness and courtesy to those who have

come to carry out this great work begun by the humble efforts of the unskilled soldier. The fact, however, that the soldier made this effort, that he could thus be generous, sympathetic, and thoughtful for the future welfare of his foe, that he was willing to teach and patiently toil with the children of his enemy, shows a spirit of which any nation might well be proud, and should give the name "soldier schoolmaster" a high place in the history of warfare.

The first General Superintendent of Public Instruction, Dr. F. W. Atkinson, was appointed May 5, 1900. After making an extended investigation as to the needs of the Department, recommendations were submitted by him to the Commission. In January, 1901, an act was passed by the Commission creating a Department of public instruction and providing for normal and trade schools in Manila and a school of agriculture in the Island of Negros. This act also provided for the employment of 1,000 American teachers, most of whom were to be brought from the United States.

In the administration of the affairs of the Bureau of Education the General Superintendent was assisted by division superintendents. The division superintendents resided in the ten divisions into which the Archipelago was divided. Under the supervision of the General Superintendent, each division superintendent exercised immediate control over the schools of his division.

As more teachers were employed and the school affairs of more towns required the attention of the division superintendents, it was found that the ten division superintendents could not properly perform the work expected of them and the number was increased from ten to eighteen. Under this organization nearly 1,000 American teachers were appointed and assigned to positions in different parts of the Archipelago, and later provision was made for the appointment of deputy division superintendents. Finally the number of division superintendents was increased to thirty-six and the office of deputy division superintendents was abolished.

The American teachers were appointed or selected as a rule in two ways—either directly by the General Superintendent or by persons or institutions in the United States authorized to select a definite number. These teachers were not, however, all sent from the United States, but a number were appointed who were already in the Philippines. Among these latter were included discharged soldiers and wives and relatives of officers and civilians.

The number of American teachers connected with the Bureau of Education between January, 1901, and September, 1902, was 1,074, but the highest number on the roll at any one time was 926. The total number separated from the service during that period was 229. Of these 15 died, 2 left on account of the death of other persons, 61 by reason of sickness, 69 were wives of soldiers and other transient residents who had been appointed in the Islands, 10 women married, 24 were appointed to

civil positions, 3 were appointed as military officers, 8 were dismissed, 7 deserted, and 30 resigned.

The strong desire on the part of the more intelligent Filipinos to have their children educated and the aptitude of the children to learn have generally made the way of the American teacher easy. This friendly attitude of the people toward the teachers has been met by the heroic efforts of many of the teachers on behalf of the Filipinos afflicted with cholera. When the scourge appeared and the schools were closed, in almost every instance the teacher stood at his post and did whatever was possible to relieve the sufferings of the people and impede the progress of the disease, and four of them became its victims.

While the American teachers have already rendered important service in beginning the work of public instruction in harmony with American ideas, it is nevertheless true that the ultimate character of the public instruction in the Philippines must depend on the character of the Filipino teacher which it will be possible to develop.

Under the Spanish régime the Filipino teachers were paid by the insular government. While the salaries themselves were small, the teachers were permitted to make small monthly charges for tuition to pupils who were able to pay. Text-books, furnished to the teachers by the Government for distribution, were often sold to the pupils. Thus, when the difference in the cost of living, then and now, is considered, it is probable that teaching conditions were in many cases more desirable at that time than at present. The Filipino teacher is now paid from the funds of the province in which he teaches.

All American teachers in the Islands are on the pay roll of the Insular Government, not that of the provinces in which they teach. The Commission made provision (1903) that will enable the General Superintendent to place a number of Filipino teachers in the employ of the Insular Government, making them servants of the insular instead of the local government and placing them on the same plane as the American teachers. This transfer is to be made in recognition of meritorious services, and the number will not exceed 150 the first year.

In the day schools of Manila, in July, 1901, the number in attendance was 5,123. On account of the cholera, in August, 1902, it was 3,044. In the report of 1901 it was said at the time there were probably over 150,000 Filipino pupils enrolled in the free primary schools and over 75,000 in actual attendance. It was stated that there were probably 3,000 to 4,000 elementary Filipino teachers, 1,800 to 2,000 of whom were receiving one hour of English instruction daily; that there were at least 10,000 adults receiving instruction in English in the evening schools, and that there would shortly be from 20,000 to 30,000 attending these schools. During the year 1902 there were more than 200,000 Filipino pupils enrolled in the primary schools, about 65 per cent of whom were

in actual attendance. The number of Filipino teachers appointed by the division superintendents was 2,625 and the total estimated number 3,400. There was in 1902 a combined teaching force of Americans and Filipinos of 4,227. The night-school enrollment for the same year was about 25,000, and the estimated actual attendance about 70 per cent of this number. Between 15,000 and 20,000 pupils were enrolled in the provincial schools of secondary instruction.

The figures given in the foregoing paragraph (from a former report) are undoubtedly too high. According to reports recently received (August, 1903) from division superintendents, the total number of American teachers is now 740, of Filipino teachers about 2,300, and of pupils enrolled in the Government schools about 130,000.

*Statement of population as per recent census, giving also school enrollment and assignment of teachers, by divisions, September 1, 1903.*

Division.	Christian population.	Number of pupils enrolled.	Number American teachers.	Number of Filipino teachers.	Population per teacher.
16. Leyte and Samar	653,765	3,625	25	-----	26,151
13. Iloilo and Antique	532,256	8,086	53	171	10,043
10. Cebu	518,000	3,636	31	177	16,710
25. Pangasinan	397,523	6,496	27	99	14,722
2. Albay and Sorsogon	355,921	2,401	27	45	13,146
22. Occidental Negros	309,959	5,515	18	123	17,220
5. Bohol	268,394	6,840	12	95	22,366
24. Pampanga and Bataan	262,372	7,002	34	111	7,717
4. Batangas	258,802	5,035	31	62	8,349
3. Camarines	233,183	3,161	29	55	8,041
8. Capiz	224,951	822	13	14	17,304
1. Manila	223,109	4,000	66	151	3,380
6. Bulacan	220,289	3,400	28	109	7,867
7. Cagayan and Isabela	214,514	4,900	22	51	9,751
12. Ilocos Sur and Abra	209,547	16,143	30	161	6,985
30. Tayabas	197,239	3,682	24	69	8,218
23. Negros Oriental	186,397	2,943	21	69	8,876
11. Ilocos Norte	176,717	3,383	16	60	11,045
14. Laguna	169,000	2,870	26	42	6,500
26. Rizal	143,422	2,636	24	100	5,976
19. Misamis	138,329	832	12	36	11,527
9. Cavite	135,243	2,487	24	39	5,671
29. Tarlac	134,297	1,617	18	49	7,460
20. Nueva Ecija	132,271	2,379	14	27	9,447
15. Union	110,164	8,915	15	79	7,344
31. Zambales	100,953	2,492	12	45	8,413
28. Surigao	98,714	5,132	7	62	14,102
27. Romblon	52,858	3,000	8	30	6,607
17. Masbate	45,000	1,218	11	17	4,090
32. Mindoro	31,331	500	2	25	15,665
35. Paragua	27,481	1,593	5	27	5,496
21. Nueva Vizcaya	16,071	1,800	4	35	4,017
34. Lepanto and Bontoc	-----	310	2	-----	-----
33. Benguet	-----	184	3	-----	-----
18. Mindanao and Jolo	-----	1,625	19	75	-----

Increased attention is being given to plans looking to the development of facilities for preparing Filipinos for more efficient work as teachers. These facilities have been furnished by the Manila Normal School, the branch of the Manila Normal School organized for the training of Filipino teachers actually engaged in the work of instruction in Manila, in the provisions of the provincial schools for normal work, and in the various normal institutes held during the summer vacations. The Ma-

nila Normal School is, perhaps, the most important single institution which has been organized within the Bureau of Education.

Its forerunner was the preliminary school organized in Manila while Dr. David P. Barrows was city superintendent of schools.

#### THE PRELIMINARY TERM OF THE MANILA NORMAL SCHOOL.

The preliminary term of the Manila Normal School, from April 10 to May 10, 1901, was conducted by Dr. David P. Barrows, then superintendent of city schools of Manila.

It was held in the Municipal School building in the Walled City, following the vacation of this building by the Spanish Sisters of Charity. The work of repairing the building and of sending out notices (in English and Spanish) to the Filipino teachers in Manila and the provinces was promptly done, and special rates for the teachers from the provinces were arranged with the shipping companies. Over half of the important companies gave free transportation.

The attendance is shown in the following table:

Teachers, and aspirants for teachers' positions admitted to class work .....	600
Number in regular attendance to the end of term.....	570
Teachers in attendance from Manila schools .....	103
Number of male teachers from provinces holding positions.....	95
Number of female teachers from provinces holding positions.....	42
Total number of women in attendance.....	170
Average age of pupils attending .....	25
Number of provinces and islands represented .....	23

#### PROVINCES REPRESENTED.

Abra.	Laguna.	Ilocos Sur.
Samar.	Union.	Zambales.
Panay.	Nueva Ecija.	Tayabas.
Bulacan.	Mindoro.	Bataan.
Manila.	Cavite.	Morong.
Mindanao.	Pangasinan.	Sorsogon.
Pampanga.	Ilocos Norte.	Leyte.
Batangas.	Tarlac.	

About 10 per cent of those coming from the provinces were able to speak the English language quite well. Of the 600 teachers enrolled it will be noted that 570 of them remained to the end of the term. Counting all causes of absence, necessary and otherwise, the percentage of class attendance averaged about 98, a most excellent record.

Thirty-three classes were formed, graded as carefully as might be, in English, geography, and arithmetic, these three branches affording a basis of primary instruction. Beside this regular class work each attendant at the school was required to attend the kindergarten and art class four times and the manual training, nature study, and physiology six times each during the course. Considerable time was devoted to music.

Singing formed part of the opening exercises of each day, and an orchestra was organized under the leadership of one of the teachers.

Forty-seven American teachers, most of them from the Department of Manila schools, devoted themselves earnestly to the work, not only as teachers of classes, but also as office assistants, interpreters, librarians, museum curators, and in other administrative capacities.

Beside the amount of actual knowledge acquired, which could not be expected to be great in the short time given, there were two purposes served by this course. One was to inspire the Filipino teachers with confidence in the educational administration, to show them that our Government was going to make use of their services, and not displace them, as many of them feared would happen when more American teachers arrived. The other purpose was to give them some insight into American methods, to give them, as nearly as conditions would permit, an ideal American school which would be a model for them to use later in their work as teachers.

This idea was carried out in all their classes, and in addition there was a kindergarten class conducted for their observation. Twelve little children, nine of them Filipinos, were under the charge of two teachers thoroughly trained in kindergarten work. Frequently as many as fifty teachers were observing the work at a single time, and no work was watched with greater interest.

At the close of the course it was felt that its purposes had been accomplished, and that a good beginning had been made in the important problem of training the Filipino teachers by American normal methods.

In its present form the Manila Normal School was organized by Dr. E. B. Bryan, later General Superintendent for the Islands. In its beginning its sessions were held in the building known as the "Escuela Municipal," in the Walled City. On account of the occupancy of the building by the Manila Grammar School in the forenoon, the classes of the Normal School assembled only in the afternoon. The curriculum covered five principal subjects—English, geography, American history, arithmetic, and science—which were taught on five days of the week, and two subordinate subjects—music and art.

Prior to January 1, 1902, there were 310 pupils enrolled, of whom 292 were young men and 18 were young women. The pupils in the school came from 24 provinces and were taught by 11 American teachers.

Better quarters were finally secured, and sessions were held during both the forenoon and afternoon; and during the summer term of 1902, 333 pupils were enrolled, of whom 70 were young women, and had it not been for the outbreak of cholera and the consequent rigid quarantine restrictions the enrollment would have reached 500. In the new quarters the school has been enlarged and the scope of instruction widened.

Its aim has been to improve the quality and raise the standard of the



work done, rather than to increase in numbers. At the opening of the school for the year 1903-4 the present principal, Mr. G. W. Beattie, found it possible to insist upon a higher training in the entering class than before. Scores of applicants were below the standard set, either in English or general preparation, and when the normal preparatory classes were filled such applicants were turned over to the city primary schools or to the new secondary schools that have recently been opened in Manila. This year finds the Normal School provided with well-equipped laboratories for botany and physics and a dormitory has been provided for the benefit of young lady students coming from the provinces. This provides a pleasant home for about 40 girls, who are under the charge of one of the lady teachers of the Normal School. At present the number of teachers in the school is 18 and the number of students 444.

Prior to August, 1902, the schools of Manila held two sessions daily, one in the morning and one in the afternoon, the last hour of the morning session being set apart for the instruction of the Filipino teachers. The instruction was given by the American teachers in the schoolhouses where they were severally employed. Given in small groups, without systematic organization or effective supervision, the quality of the work depended largely on the personality of the American teachers. Where the teacher was strong and methodical the work was orderly and effective. In the course of time, however, it became necessary that the Filipino teacher should be subject to a more regular discipline and more systematic instruction. They needed training, not only in the English language but also in the various subjects that entered into the curriculum of the primary school. It was therefore decided that the sessions of the schools for teaching the children should be continued throughout the forenoon, that the afternoon sessions should be abandoned, and that all Filipino teachers should be assembled at one place and organized into a normal school to be held between 3 and 5 o'clock in the afternoon.

Under this plan 150 Filipino teachers engaged in the public schools of Manila were assembled for five days in the week, divided into small sections, and were taught by the American teachers regularly assigned to the Manila schools. Legally this school was a branch of the Manila Normal School, and has been conducted under the general direction of the principal of that school.

At the opening of the present school year (1903-4) the plan of assembling the teachers each afternoon for instruction was abandoned. This was not because the plan had been unsuccessful, but principally owing to the lack of a suitable building, centrally located, in which the session might be held. The building that had been used the year before for this purpose was needed for other Government uses. The plan followed this year has been for the American teacher of each school to give

his Filipino teachers normal instruction each afternoon; the children having, as before, a morning session only.

The present number of primary schools in the city of Manila (August, 1903) is 30, with 4,000 pupils enrolled. There are 151 Filipino and 50 American teachers. The two secondary schools now established have 8 American teachers and 1 Filipino teacher, with an enrollment of 500. There are 4 kindergartens, with 5 American and 4 Filipino teachers and an enrollment of 100. The school for American children has 10 teachers and 120 pupils.

The city now owns but five school buildings, the rest being rented, and in most cases inadequate. Plans for the near future include several school buildings that will be a credit to the Government.

An important step in the development of the system of public instruction in the Philippines was the establishment and organization of the provincial schools of secondary instruction. The law authorizing such schools was enacted March 7, 1902. Before that time the Bureau of Education had been chiefly concerned with the organization of primary schools.

As a consequence, many of the more advanced pupils in these schools, who had been taught English, began to entertain serious doubts respecting the possibility of continuing their studies in English in schools of a higher grade, and some of them thought it advisable to resume their studies of Spanish in order that they might be prepared to enter the Spanish schools of secondary instruction. This was particularly true in Manila, where there were several secondary schools which were maintained under the authority of the church. As an example we may mention El Ateneo de Manila.

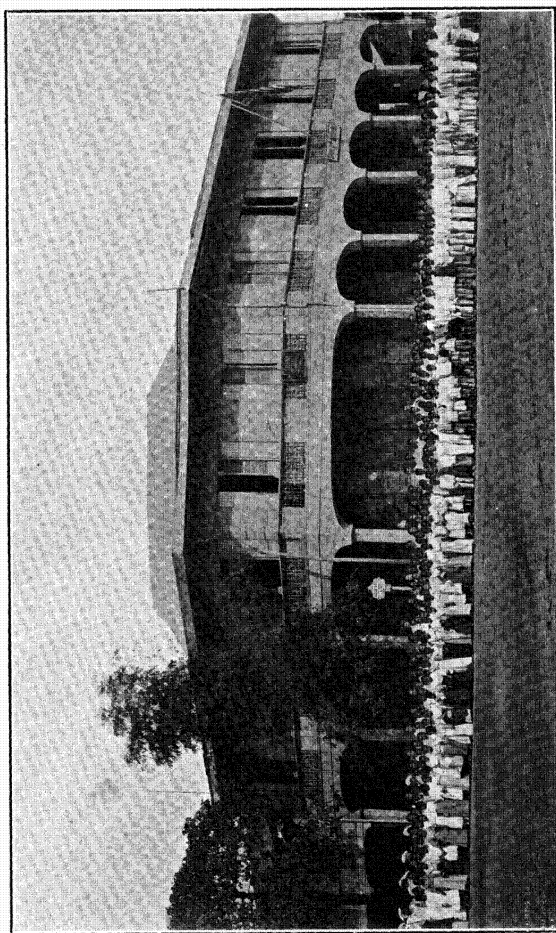
This school gives the degree of bachelor of arts, and also gives the titles of graduate in commerce, graduate in mechanics, surveyor, stenographer, and mining assistant. The courses leading up to these titles are made up from the following subjects, which are taught in the school: Latin and Greek (three years), Spanish and French, rhetoric and poetry, philosophy, political economy, English language (five courses), universal geography, universal history, commercial geography, natural history, physics and chemistry, arithmetic, algebra, geometry, trigonometry, mercantile arithmetic, topographical drawing, topography, geometrical drawing, agriculture, bookkeeping, commercial law, statistics, mercantile correspondence, stenography, typewriting, piano, violin, harmony, and gymnastics.

These were the only important schools of this grade that existed in the Archipelago at the beginning of the American occupation, and only a comparatively small part of the inhabitants of the provinces found themselves in circumstances which permitted them to give their sons the

advantages of these schools. It was advisable, therefore, to meet as early as possible the strong demand in the provinces for schools to which children could be admitted on completion of their primary instruction. With the enactment of the law of March 7, 1902, the general plan of the system of public instruction began to assume real form. This plan provided that in the course of time the primary schools should exist under municipal authority, the secondary schools under provincial authority, and higher instruction, together with whatever special schools might be established, should be supported directly by the Insular Government. Schools of secondary instruction were thus to become the peculiar charge of the provincial government. The provincial board was authorized to provide, by construction or purchase or renting, such school building or buildings in the province as in the opinion of the board might be necessary, to be used for the free secondary instruction of pupils resident in the province.

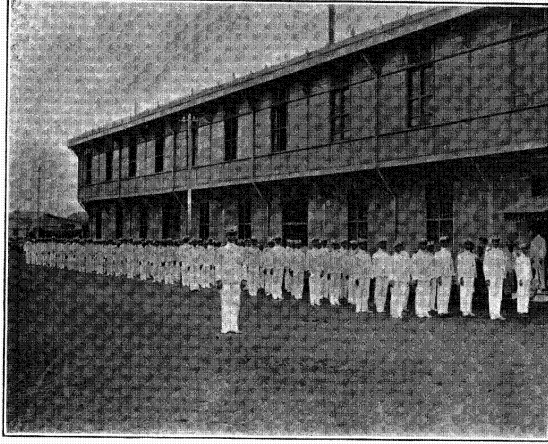
In view of the rude condition of the provincial population with respect to education and in order to provide an effective and simple organization, it was determined that the secondary schools in the provinces should cover the widest range of subjects that it might be found necessary to teach. It was recognized that these provincial schools would furnish the highest grade of instruction that would be demanded by any considerable number of residents of the provinces; that they would become in the course of time the colleges for the people; and that the few who might demand instruction such as is given in a university would seek that instruction either in Manila or in the United States. It was, therefore, provided by law that the secondary instruction given in the provincial schools might include, in addition to academic commercial subjects, manual training, instruction in agriculture, and normal-school instruction. While it is expected that ultimately the expenses of equipping and maintaining the provincial schools will be borne by the provinces, it is provided that for the time being the salaries of the teachers in these schools shall be paid from the Insular Treasury. In their establishment and conduct they are subject to the supervision of the division superintendents and the General Superintendent of Education. When, however, it shall be determined by law that the condition of finances of a province will justify for the future the payment of the salaries of teachers and all the expenses of supplies and equipment for secondary schools from the provincial treasury, such salaries and expenses shall be met by the several provinces.

Thirty-seven schools for secondary instruction had been established prior to September 1, 1903, in the principal towns of the Archipelago. Most of these include high-school and normal training and some have industrial courses given by teachers especially trained for that work. Secondary schools will be established in all towns of importance as soon as graduates from the primary schools are ready for work of this grade.

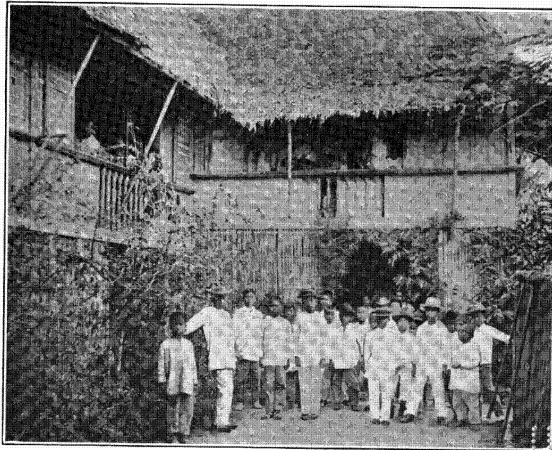


SAMPALOC PRIMARY SCHOOL IN MANILA.





THE NAUTICAL SCHOOL IN MANILA.



A PRIMARY SCHOOL IN SINGALONG, MANILA.

41

The following is a list of secondary schools, by provinces, with enrollment on September 1, 1903:

Province.	Town.	Enrollment.
Albay	Guinobatan	52
Batangas	Batangas	118
Do	Lipa	105
Do	Bauan	116
Do	Taal	93
Do	Balayan	96
Do	Tanauan	71
Bohol	Tagbilaran	70
Bulacan	Baliuag	201
Cagayan	Tuguegarao	242
Camarines	Nueva Caceres	270
Capiz	Capiz	50
Cavite	Cavite	150
Cebu	Cebu	206
Ilocos Norte	Laoag	141
Ilocos Sur	Vigan	500
Iloilo	Iloilo	630
Laguna	Santa Cruz	158
Mindanao	Cagayan	35
Negros Occidental	Bacolod	166
Negros Oriental	Dumaguete	101
Nueva Ecija	San Isidro	172
Pampanga	San Fernando	124
Pangasinan	Lingayen	392
Rizal	Pasig	88
Romblon	Romblon	40
Sorsogon	Sorsogon	84
Surigao	Surigao	74
Tarlac	Tarlac	150
Tayabas	Boac	101
Do	Lucena	101
Union	San Fernando	188
Zambales	Iba	73
Manila	Manila (normal)	400
Do	Manila (nautical)	113
Do	Manila (trade)	276
Do	Manila	193
Do	Manila	101

While English will continue to be the language in which the instruction in these schools is given, an opportunity will be offered, to such persons as desire it, to acquire also a knowledge of Spanish.

By reason of the large part which the Spaniards have played in the history of the Philippines and the fact that the principal sources of our knowledge respecting these Islands are in Spanish, it will be desirable for many years to come that Filipino scholars and men of special cultivation shall, in addition to their knowledge of English, have also such command of Spanish as will make accessible to them the history and information relating to their early institutions. This language and its literature, therefore, will constitute one of the subordinate subjects in the curriculum of the provincial school.

The normal instruction in the provincial schools is designed to be so arranged that the pupils who have completed two years' work in these schools may take the last two years of their course in the Manila Normal School. Thus the pupils from the provinces will be able to spend half of the four years' course in the provincial school and half in the Manila Normal School. This will enable all who desire it to have the prestige



of graduating from the school which constitutes the central feature of the system of normal instruction.

Another form of normal instruction is that which has been given at normal institutes held during the long vacation. While the work which has been done by the American teachers in one hour a day devoted to the instruction of individual or little groups of Filipino teachers has produced excellent results, it has been found in the provinces, as well as in Manila, that it was desirable to assemble the Filipino teachers in large bodies and to give them more systematic instruction and discipline than was possible when scattered in the various pueblos and barrios throughout the provinces.

These normal institutes have been important factors in the development of efficient Filipino teachers, and they have afforded the American teachers opportunity for very satisfactory and pleasant work. As a rule the Filipino teachers understood that their progress in the institute work would make them more valuable to the Government and therefore bring them material advancement. With this incentive and the hearty interest that most of them have in their work the institutes have been of great value.

The Normal Institute of Pangasinán, from June 15 to August 21, 1903, may be given as an example of successful work. The attendance enrollment was as follows: Dagupan, 337 adults, teachers, and others; 134 aspirantes and advanced pupils; Lingayen, 392 aspirantes and advanced pupils; total, 873. The subjects taught were English, arithmetic, geography, history, freehand drawing, bookkeeping, Spanish, nature study, and school management. In addition to the foregoing, a model training school was maintained in Dagupan for practice teaching. The number enrolled was 175. This school was taught by native teachers under the supervision of American teachers.

Fuller knowledge of the condition of the Filipinos with respect to language seems to justify the decision formed in the beginning to make English the language of the schools. The great majority of the Filipinos are ignorant of Spanish. This is particularly true of the children. Those who profess to be able to use this language have but an imperfect command of it. The native dialects are numerous and so unlike that no one of them can be employed as the common medium of communication. There are no books in any one of them that could be advantageously used in a system of public instruction. The few newspapers that are printed in the native dialects furnish but little of the intellectual guidance or stimulus needed by the inhabitants of the Islands in their aspiration to be counted among civilized peoples. Of such papers there are only five in Tagalog, two in Visayan, and one in Bikol, but none in any of the other six dialects of the civilized tribes.

Elementary books might have been prepared and printed in the various dialects and made the basis of primary instruction. Pupils having

passed over this stage of their cultivation by this means would have found only a barren waste before them. There is no great advantage in learning to read in a language which offers nothing worth reading to those who have acquired the art. Children educated in the common schools with only such means as may be provided in Tagalog or Bicol have still practically no access to sources of information regarding the world. The limits of the province remain their horizon. They are shut out from the advantages enjoyed by their more fortunate fellow-countrymen who have had the means to enable them to acquire a language through which may be derived a knowledge of civilized society. The boy who grows to manhood knowing only a language without a literature finds that as a result of his training in school he has not the means for increasing his knowledge, and he very readily falls back into the mental darkness of the semisavage state.

The boy who in his school days has learned the language of a civilized nation, even if he has learned nothing else, has put himself en rapport with civilization. Aside from the practical circumstances of his life, it makes little difference whether he learns English, French, German, or Spanish, but it makes a great deal of difference whether he learns French or Tagalog or Bicol. The one makes him a citizen of the world, the other makes him a citizen of a province in the Philippine Islands. If the Government were to make the local dialects the media of school instruction, a limited number of the more or less wealthy and influential persons would use the facilities which they can command to learn English for the sake of the additional power or other advantages it would give them in the communities to which they belong, and these advantages or this additional power would tend to perpetuate the prestige and domination of the present oligarchic element in Filipino society. The knowledge of English which the public schools offer to the youth of the Islands will contribute materially to the emancipation of the dependent classes and to the development of that personal independence which is at present almost entirely wanting in the great mass of the people, but which is necessary to the maintenance of a liberal government.

It may, perhaps, be difficult to change the fundamental ideas of a race, but it is not very difficult, under proper circumstances, rendered permanent for a considerable period, for children of one nation in the process of growth to manhood to acquire a complete practical knowledge of the language of a foreign race. The use of a vernacular dialect in the intimate relations of life and of a literary language in the commercial and public affairs is not uncommon. Practically all Filipinos who use the Spanish language in their more important concerns make at the same time more or less use of one or another of the local dialects; yet under Spanish rule no persistent effort was made to give the great body of the people opportunities for learning Spanish, and in many instances not only was no encouragement offered to the acquisition of a knowledge of this

language, but positive hindrances were put in the way of acquiring it. The effort of the Americans to give to the Filipinos a knowledge of English is in marked contrast to the policy carried out by some of the European nations in their oriental possessions. This effort has been met by considerable enthusiasm on the part of the people and, considering the brief period during which schools have been maintained, has produced noteworthy results. The pupils in all the schools where American teachers have been stationed are able to receive instructions in English, and in the larger towns most of the Filipino teachers have acquired sufficient knowledge of English to enable them to use it successfully in their teaching. The 150 Filipino teachers of Manila, as students in the recently established branch of the Manila Normal School, and the students of the normal school itself use only English in their recitation and reports.

The progress of industrial education has met, and probably will continue to meet, with certain obstacles in the Philippines. The people have been accustomed under their earlier instruction to regard education as a means of putting themselves in a position where manual labor is not required. Hitherto the Filipino youth has looked upon the instruction of the schools as a means of preparing him to become a teacher, a civil officer, a clerk, a lawyer, a physician, or a priest. That phase of education through which the young man expects to become a skillful workman has lain almost entirely below his horizon. This is not so much a fault of his race as it is a fault of the nation under which he had been a subject for three centuries. Spain has impressed upon the Filipino her lack of appreciation of that kind of work and that higher form of skill which comes from systematic education. Whatever progress, therefore, is made in industrial education must be made in opposition to a strong prejudice, but this prejudice is not thought of as invincible.

Standing upon a stage of civilization distinctly lower than that of the civilized peoples of the West, they are likely in the course of a short time to imitate the members of that nation with whom they are brought into closest relations, particularly when that nation removes all obstacles to their accepting new customs and habits. In the course of time, when they learn more about America and come to understand the marvelous progress which has there been made, and that the wealth of the production of that country rests largely on the fact that America is a nation of workers, it is hoped that their ancient prejudices will fall away and that they will be inclined to accept, with certain modifications, American ideas with respect to industrial affairs. They are likely to be encouraged in this view by the introduction of machinery and various appliances by which the ratio of human labor to product is diminished. At present they are almost entirely without tools in any way suitable to the cultivation of the soil, and the only carpenters' tools with which they are familiar are those used by Chinamen, which were antiquated centuries ago.

In the Public Printing Office, with its fine modern machinery, they

are gradually adapting themselves to the new condition. In view of the fact that Americans who receive larger salaries than they ever hoped to receive are not ashamed to work, their ancient aversion to labor is beginning to appear somewhat absurd. One of the delicate tasks of the industrial schools is to break down this ancient prejudice, and on their success in this undertaking depends the possibility of introducing and carrying to successful results the system of industrial education. Hitherto comparatively little has been accomplished. This is due in part to the lack of appliances and in part perhaps to the difficulty of acquiring a knowledge of the Filipino's attitude toward this work and of hitting upon the proper means of overcoming his prejudices. At the same time numerous requests have been received from the provinces asking that facilities be furnished for industrial instruction in some of the simpler forms of work; and to furnish a legal basis for such instruction it has been especially provided in the provincial schools of secondary instruction that the curriculum should embrace manual training. Under this provision steps have already been taken in many of the provinces to provide an industrial department in the provincial school.

The present enrollment in the Manila Trade School (August, 1903) is as follows:

Subject.	Day school.	Night school.
Mechanical drawing -----	67	34
Telegraphy -----	37	38
Plumbing -----	11	17
Carpentry -----	51	21

Of these 110 receive instruction in English. The school has 1 Filipino and 6 American teachers. It is the intention to add courses in stenography and typewriting in the near future. The evening classes of the school have been productive of very good results. Another year will probably see the Trade School located in another section of the city, among the people whom it is intended to reach.

The Nautical School was reopened in Manila December 15, 1899, with an attendance of 22 pupils. This school is designed to educate young men for the merchant-marine service. Owing to the mountainous character and small size of these Islands, transportation by water must always continue to be the principal and almost exclusive method. This school is intended to fit Filipinos to take control of their own shipping instead of permitting it to be controlled by people of other nationalities.

The instruction during the first year includes arithmetic, English, geography, and drawing. That for the second year, English, algebra, geometry, geography, and drawing. That for the third year, English, history, geometry, plane trigonometry, physics, mechanics, geography, and drawing. During the fourth and final year the pupils are instructed in spherical trigonometry, nautical astronomy, navigation, seamanship,

hydrographical drawing, general and United States history, and English. All classes are instructed in practical seamanship three times a week.

During the long vacation the pupils of the most advanced classes have been placed on commercial vessels for actual experience in their future profession.

The first object is the Americanization of the students, in language, habits of thought, manner of performing work, and general moral principles. The next object is the technical education in seamanship, navigation, and kindred subjects. In view of the fact that the students had little, if any, satisfactory primary training before their admission to this school, it is deemed that very encouraging progress has been made.

The organization of the School of Agriculture provided for by Act No. 74 has been delayed with a view, if possible, to bringing it into connection with the proposed experimental sugar plantation in the Island of Negros. While this project was under consideration and investigations were in progress to determine the proper plans for such a plantation it was impossible to fix definitely the site of the proposed school. Finally, in view of the large amount of work devolving upon the General Superintendent of Education, and in view of the fact that the Bureau of Agriculture would have constantly in its service a number of experts who might be used for some part of the year as instructors in the school and at other times carry on their various investigations, it was determined that the School of Agriculture proposed for the Island of Negros should be placed under the Bureau of Agriculture, and the Government farm at La Granja was selected as its site.

While thus the School of Agriculture is placed under the jurisdiction of the Bureau of Agriculture, arrangements have been made by which certain teachers in the provinces will be employed to coöperate with the Bureau of Agriculture in making various experiments and in gathering such information as may be useful in promoting knowledge of the agricultural conditions of the Islands. At the same time the law establishing secondary instruction in provincial schools provides for the extension of the curriculum beyond the ordinary course of high-school instruction and makes it embrace not only commercial subjects and manual training, but also normal-school instruction and instruction in agriculture, which means that the provincial schools may on a larger or smaller scale, as the authorities of the province may determine, carry on instruction and experiments in such branches of agriculture as may be supposed to be adapted to the conditions in the province in which any provincial school is established.

One of the great handicaps in the work at present is the lack of suitable school buildings in many of the towns. During the late insurrections many substantial buildings were partly or wholly destroyed and in the majority of cases have not been rebuilt, but instead replaced by those of a temporary character.

In answer to a special circular letter sent out to the teachers, a detailed report was made on school buildings remaining from Spanish times, from which it was possible to gain accurate information on the condition of each schoolhouse. The estimated number of school buildings is 1,500, many built of stone, but the larger number of wood and nipa. For a time some schools were conducted in convents, but this practice in general was discontinued on the recommendation of the Civil Governor in order to avoid any harsh feeling between the church and civil authorities. With the exception of a comparatively small number of barrio schoolhouses recently built, these school buildings handed down from the old Spanish régime have been and are now the homes of the American schools. As the provinces become financially able to do so the better and larger schoolhouses that are needed will be built.

Often the buildings are used for other purposes—as the presidencia or other office, as a dwelling, or even as a store. The practice obtained under Spanish rule of using the schoolhouse as the home of the teacher and his family—a custom that has been set aside now with the idea of raising the dignity of the school building.

The schoolhouses are in various stages of equipment; some have received the modern American desks which recently arrived, others are fitted with rather crude but serviceable Filipino desks, and still others have nothing but a few bamboo benches for furniture. The floor space varies from 160 to 3,000 square feet, and the amount of blackboard surface from none to 600 square feet. The buildings contain from 1 to 8 rooms, and in general the conditions of light and sanitation are good, but the state of repair is generally only fair, frequently poor, and in many cases bad.

Activity on the part of the towns in providing suitable schoolhouses is on the increase, and when these municipalities are on a firmer financial basis, more is to be expected. Furthermore, with the withdrawal of the soldiers from various towns which have come under civil régime, where their services are no longer needed, the number of satisfactory buildings for school purposes increases.

As yet but little has been accomplished in the way of building new schoolhouses, lack of funds being the chief cause of the delay. Since the establishment of the Bureau of Architecture, during the latter part of 1901, the construction of all public buildings comes under the control of that Bureau.

The presence of a large number of Igorrotes among the interior mountains of northern Luzón makes it impossible for the Government to ignore the problem of their education. They do not appear to wish either our religion or our clothes; yet from this we may not safely infer that we are able to give them nothing for their advantage which they may be willing to accept. In their present condition they have many desirable qualities. By their physical development and marvelous powers of endurance

they put to shame the thin, weak, and indolent dwellers of the lowlands. They are able to work, and when put to a task perform it with energy without the constant prodding of an overseer. They are much more honest than many who have had the advantages of civilization. They need, particularly, to be taught to be better masons, better carpenters, better gardeners and farmers, and more skillful makers of the various articles that are used by them.

The knowledge of the wisdom and traditions of their ancestors apparently satisfies them. Instruction among them, to be successful, must start from their point of view, and the instructor has to exercise great care not to do violence to their traditional ideas.

Teaching among the Moros on a limited scale has already been undertaken in two schools, one in Zamboanga and another in the Island of Joló, but while the results have been good, the number reached by these schools has been very small. The experience of the past few years shows that we need for the Moros a different system from that we have given the other tribes. The Moros are as eager as any to learn our language, but to do the most efficient work with them a special plan shaped to accord with their particular needs and desires must be devised. The work of Moro education has been placed in competent hands and a successful effort may perhaps do more to settle the Moro problem than could be done in any other way.

## Chapter XVI.

### THE TARIFF.

First tariff arrangements—Manila opened as a port of entry—Customs receipts—Revision of tariff necessary—Board to revise tariff—Notice given to merchants—Work transferred to Commission—Tariff transmitted to Washington—Proposed tariff published—Criticisms invited—War Department revision—Approved by Congress—Guiding principles—Summaries of exports and imports—Tariff work well done.

On July 13, 1898, seventy-four days after Dewey's May-day victory in Manila Harbor and while the flag of Spain was still floating over the city, American occupation of the entire Archipelago was anticipated by an order issued at Washington in the following language:

WAR DEPARTMENT, *Washington, July 13, 1898.*

The following order of the President is published for the information and guidance of all concerned:

“EXECUTIVE MANSION, *July 12, 1898.*

“By virtue of the authority vested in me as Commander in Chief of the Army and Navy of the United States of America, I do hereby order and direct that upon the occupation and possession of any ports and places in the Philippine Islands by the forces of the United States the following tariff of duties and taxes, to be levied and collected as a military contribution, and regulations for the administration thereof, shall take effect and be in force in the ports and places so occupied.

“Question arising under said tariff and regulations shall be decided by the general in command of the United States forces in those Islands.

“Necessary and authorized expenses for the administration of said tariff and regulations shall be paid from the collections thereunder.

“Accurate accounts of collections and expenditures shall be kept and rendered to the Secretary of War.

“WILLIAM MCKINLEY.”

Upon the occupation of any ports or places in the Philippines by the forces of the United States the foregoing order shall be proclaimed and enforced.

R. A. ALGER, *Secretary of War.*

Just one month after the date of the above order Manila surrendered to the American forces and the Spanish dominions in the Orient passed to American control. Manila was opened to commerce as a port of entry August 20, 1898, in obedience to instructions from the President; Iloilo, February 22, 1899; Cebú, March 14, 1899; Zamboanga, Siassi, and Joló, December 26, 1899. Aparri was added June 1, 1902, but since that



date both Siassi and Aparri have been closed, and Balábec, Bungao, and Puerta Princesa have been opened with special reference to the Moro trade between the southern islands and Borneo. These are the only ports of entry in the Philippine Islands, and as they constitute convenient centers from which imported merchandise can be distributed throughout the Archipelago through the medium of the coastwise trade, it is not anticipated that any increase in their number will be necessary.

The following table shows the comparison of total customs receipts, expressed in Mexican currency (where the reports are given in United States currency they have been reduced to Mexican at the rate of two to one, though the rate which has varied from month to month was higher) :

Year.	Spanish.	American.
	<i>Pesos.</i>	<i>Pesos.</i>
1890.....	3,140,954.99	-----
1891.....	3,540,603.41	-----
1892.....	4,025,517.12	-----
1893.....	4,238,815.57	-----
1894.....	4,702,952.64	-----
1895.....	4,421,716.47	-----
1896.....	5,040,705.80	-----
1897.....	5,562,139.12	-----
1898-99 (10 months and 20 days).....	-----	6,212,760.62
1900 (fiscal year).....	-----	11,084,578.30
1901.....	-----	18,249,621.40
1902.....	-----	17,050,432.96

It will be noted that there was a marked increase of receipts under American administration.

The customs tariff and regulations at first in force in the Archipelago were based upon those of the Spanish administration in existence at the time of American occupation with certain changes made from time to time. It was felt, however, from the beginning that it should be revised, for, aside from substantial objections to the rates of duties imposed, there were others due to the manner in which they were expressed and computed. Each item of import was subject to a fixed duty under the schedule, but this consisted in some instances of as many as six component parts, separately expressed, all of which had to be calculated before the total duty could be ascertained. This was due to the Spanish Government having from time to time kept the original and the additional charge separate and distinct, rather than proceeding by substitution and amendment.

Among the charges thus added were two established respectively in the years 1896 and 1897, and consisting of 2 per cent and 6 per cent so-called "ad valorem" charges. These were determined not by appraisement or ascertainment of the real value of the importation but by a table of arbitrary values originally established for Spain and extended to the Archipelago in August, 1896. The principal change in the American regulations, so far as the form of the tariff was concerned, was the

consolidation of these 2 per cent and 6 per cent "ad valorem" charges into one of 8 per cent.

This condition was felt to be unsatisfactory both to the Government and the commerce of the Islands, and as soon as the more pressing claims of the Insular Government permitted arrangements were made to revise the customs tariff and regulations and have them to conform to American ideas, taking into account the peculiar conditions of the Islands, their actual and potential development, the revenues necessary for the administration and development thereof, and the propriety of imposing the burden of taxation on those articles best able to bear a relatively high tariff, while allowing articles of prime necessity to enter under a low rate.

For this purpose there was issued General Orders, No. 80, which is as follows:

OFFICE UNITED STATES MILITARY GOVERNOR IN THE PHILIPPINES,  
*Manila, P. I., June 9, 1900.*

GENERAL ORDERS, }  
No. 80. }

By direction of the War Department, a board of officers to revise the United States provisional customs tariff and regulations in the Philippine Islands will convene at Manila, P. I., at 10 o'clock on Monday, June 18, 1900, or as soon thereafter as practicable.

Detail for the board: Lieut. Col. W. F. Spurgin, Sixteenth United States Infantry; Capt. W. W. Wotherspoon, Twelfth United States Infantry; Capt. Charles H. Marple, Fortieth Infantry, United States Volunteers.

The Collector of Customs of the Islands and the collectors of the various ports of entry will furnish to said board, upon its request, all data, statistics, and information which may be required by them in the performance of the duty enjoined.

Pursuant to the foregoing order the board convened June 18, 1900, but, on being informed that telegraphic advices had been received from the War Department under date of June 8, 1900, to the effect that instructions would be sent them to govern their work of revision, thought it advisable to await the arrival of said instructions before entering upon their active work, and, after effecting a preliminary organization, adjourned to meet at the call of the president when the same should arrive.

Before adjournment the recorder was instructed to notify in writing the three chambers of commerce in Manila—the American, the Manila, and Spanish chambers, respectively—of the appointment of the board and its purpose, and to request of these bodies, and through them the merchants comprising them, that the board be favored, as early as possible, with such criticisms in writing upon the existing customs tariff and regulations as would seem proper to be made, with specific and detailed suggestions concerning all changes, substitutions, or amendments which it might be thought would tend to the improvement thereof.

On July 13, 1900, in the belief that the instructions of the War De-

partment must be near at hand, the board again convened, all members being present.

Notices of the location of the board were immediately sent to the three chambers of commerce above named, again inviting a full expression of the views of these bodies and their individual members in all matters affecting the levying of duties upon imports and exports and the general administration of customs in the Philippines, either in writing or by oral statements before the board.

In addition the individual members of the board, in numerous cases, personally called upon merchants and importers to request of them particular data in their possession, which was felt would be of assistance in the work of framing a just and equitable schedule of charges.

The response on the part of the merchants and commercial bodies of Manila to the repeated efforts of the board to enlist their active interest and aid was disappointing. Criticism of a most general nature was freely forthcoming, but definite and tangible expressions or suggestions for the betterment or improvement of the conditions with which fault was so freely found were correspondingly meager.

The board in its report says:

To say that there is not a merchant or importer in Manila of respectable trade affiliations who has not been advised of the desire of the board to listen to all complaints and to receive all information that would tend to the improvement of the present system of tariff charges is believed to be a conservative statement, and it is felt that wherever the system of charges and imposts submitted with this report may, upon actual application or upon special and particular analysis of the different sections, prove unequal or inadequate, the apathy shown by the merchants and importers in the matters directly affecting their own interests will be largely to blame therefor. The classification of the old tariff was most unsatisfactory, and it soon became apparent that material changes therein would be necessary. Opinions of the individual members of the Board and of merchants and importers differed as to the advisability of a specific or an "ad valorem" tariff. In deciding in favor of the former the board was largely influenced by the fact that importers and vendors and their principals in the foreign markets had become accustomed to the levying of duties in the Philippines without reference to the real or market values of merchandise that would necessarily control in an "ad valorem" system.

It was urged that difficulties and confusion caused by the mistakes of importers would attend a change from the specific to an "ad valorem" system, and this objection, together with those that present themselves on account of the opportunities for fraud afforded thereby, would, it was felt, more than offset the advantages of the more equitable distribution of charges obtainable through an "ad valorem" system, but which can only be realized with the honest and intelligent cooperation of all concerned in the importation of goods from the foreign manufacturer or vendor down to the last agent in the appraisement of goods and the computation of values.

After diligent work the Army board completed the tariff, then the Military Governor, by order of the Secretary of War, turned over to the United States Philippine Commission, on August 25, 1900, the report

of the board with all information, correspondence, papers, etc., which it had collected bearing on the revision.

The Commission took up and continued the work, being engaged on the same from August 25, 1900, to December 29 of the same year, when the result of the combined efforts of the board and Commission was forwarded in the shape of a proposed act of the Commission to the War Department for the purpose of giving the same in the United States the fullest possible legislative consideration.

The proposed tariff was received by the Department February 9, 1901, and 500 copies printed bearing the following title:

"Proposed customs tariff for ports in the Philippine Archipelago, as recommended by the Philippine Commission. Suggestions and recommendations invited by the War Department until April 15, 1901, to be considered with a view to amendments before promulgation. Insular Division, Office of the Secretary, War Department, Washington, D. C."

The edition of 500, with the invitation for suggestions and recommendations, was sent to newspapers, trade papers, boards of trade, commercial bodies, chambers of commerce, exporters, and manufacturers in all parts of the country. No efforts were spared to give it the greatest possible publicity. The press was invited to call attention thereto, and as a result there was a generous response from a variety of sources.

All the correspondence received relative to the proposed tariff was briefed from time to time and forwarded to the Commission at Manila for its information. The advice and views of the collector of customs for Cuba were also requested as to a number of subjects about which it was thought that his experience would afford valuable information, and he took pains to aid in all things brought to his attention.

After the period for receiving suggestions and recommendations had elapsed the work of revision was taken up and each class, group, and paragraph was studied, and in the light of the information received some guarded changes were introduced, the most important being the introduction of a number of provisos, whereby when articles nearly equal in weight, but varying greatly in value, came under the same paragraph the specific duty was to a certain extent equalized, or made to more nearly conform to value, by stating that articles classified under such paragraph should not pay a less duty than 15 or 20 per cent, according to the nature of the goods. This it was thought would tend to equalize tariff taxes without overburdening any single article of necessary consumption and at the same time afford a material increase of revenue.

The first revision was made after a study of the tariff as a whole and in view of the suggestions offered by the commercial interests of the country. Not over 10 per cent of the paragraphs in the proposed tariff met with objections, and this may be taken as an indication of the care bestowed upon it, both by the board and the Philippine Commission.

The rates in no case, except in articles of luxury, such as sparkling

wines and fine china, are high. Articles of prime necessity have been taxed lightly; those needed in the development of agriculture and for the improvement of roads and transportation have also been made low. Prohibitive rates have been avoided, and the rapid progress and development of the Islands has been kept steadily in view, together with the other side of the question, that the Insular Government must have revenue for current expenses and for needed improvements.

After the first revision of rates by the Department, the proposed tariff was sent to the appraiser of the New York custom-house, who submitted its various classes to different expert appraisers for criticism as to the descriptive language employed, for the purpose of evading, as far as possible, all ambiguous and contradictory language. The reports of the various experts were transmitted to the Department, and their suggestions were carefully considered and, so far as it was thought best, were embodied in the tariff.

After this second revision Mr. W. Morgan Shuster, who had served as special deputy collector at Havana, Cuba, and who had been recommended to the Philippine Commission for Collector of Customs at Manila, was asked to go over the entire tariff and make such suggestions as his experience in the practical application of a similar tariff would suggest. This resulted in some changes in the rules for the customs treatment of textiles and in the regulations for levying duties upon containers of merchandise, as well as some minor modifications of rates in some few instances.

After all these changes had been made and approved 200 copies of the tariff, now called "Customs Tariff for the Philippine Archipelago," were printed, and 100 copies forwarded to the Commission with Mr. Shuster, who was charged with explaining the changes that had been made, with the reasons therefor, and the Commission was intrusted to approve or modify by cable, and authorized to enact, promulgate, and enforce the same.

Pending final instructions from Manila the tariff was translated into Spanish.

After the arrival of the revised tariff at Manila its provisions were made public and after conference with merchants and others and a number of public meetings a few minor changes were suggested, and upon their being cabled to Washington they were approved by the Secretary of War, and thereupon the Philippine Commission, September 17, 1901, enacted the tariff which had been prepared as above outlined.

When Congress met in December, 1901, a bill was introduced for the purpose of securing its approval to the act as passed by the Commission.

This bill gave rise to no little debate relative to the general policy of the administration in the Philippines, but the tariff itself was not attacked, and it stands a striking example of tariff legislation, as not a single schedule or provision was attacked in either House by either party, a

unanimity of sentiment that was extremely gratifying to those who had charge of framing the rates and schedules.

The receipts, as shown above, that have been collected under the new tariff have been adequate for the ordinary economical administration of government.

A few broad principles were guiding motives in all steps taken by the original commission of officers, by the Philippine Commission, and by the Bureau of Insular Affairs. It was desired to foster the agricultural, commercial, and industrial development of the Islands. It was felt that articles of prime necessity should be taxed as lightly as possible and imported articles consumed by the poor should bear but a light burden of taxation, while articles of luxury, consumed by the well-to-do, should lend material aid to the expenses of government. The duties on the whole are lower than the old Spanish tariff or the tariff at present in force in the United States, and yet the fact that it is a revenue tariff for the purpose of raising funds for the expense of the Archipelago was not overlooked.

The duties upon food products were greatly reduced and during the fiscal year 1902 there was a substantial increase in the importations of such articles.

The following table of the importations at Manila of the principal food products upon which the rates of duty were substantially lowered will serve as an index to the effect of that portion of the new tariff on trade throughout the Islands (the figures given are in round numbers) :

*Wheat*.—The former duty was 47 cents per 100 kilos; present duty, 25 cents per 100 kilos. There was practically no wheat in grain imported during either the calendar year ending November 15, 1901, or from that period up to the present time.

*Wheat flour*.—The former duty was \$1.63 per 100 kilos; present duty, 40 cents per 100 kilos. The importation of this article during the past year has shown an increase over the preceding year from 114,000 to 151,000 barrels.

*Hay, forage, and bran*.—The former duty was 14 cents per 100 kilos; present duty, 5 cents per 100 kilos. The importations of these articles have increased over those of last year from 700 to 3,000 tons.

*Canned fruits*.—The former duty was 15 cents per kilo; present duty, 2 cents to 4 cents per kilo. Increase in importations from 42,000 to 700,000 pounds.

*Canned meats*.—The former duty was 15 cents per kilo; present duty, 5 to 20 cents per kilo (the greater proportion of these goods going under 5 cents per kilo). There has been an increase in the importations of canned meats from about 6,000 to 165,000 pounds.

*Jerked beef*.—The former duty was \$4.82 per 100 kilos; present duty, 75 cents per 100 kilos. The importations of this article have increased from 300 to 2,500 pounds.

*Hams*.—The former duty was \$9.13 per 100 kilos; present duty, \$3 per 100 kilos. The importations of this article have increased from 692,000 to 1,800,000 pounds.

*Lard*.—The former duty was \$9.13 per 100 kilos; present duty, \$1.60 per 100 kilos. The importations of this article have increased from 1,200,000 to 2,000,000 pounds.

*Canned salmon.*—The former duty was 15 cents per kilo; present duty, 3½ cents per kilo. The importations of this article have increased from about 8,000 to 1,500,000 pounds.

*Caviar, etc. (in cans).*—The former duty was 15 cents per kilo; present duty, 20 cents per kilo. The importations of this article have decreased from 12,000 to 7,000 pounds.

*Rice (unhusked).*—The former duty was 59 cents per 100 kilos; present duty, 40 cents per 100 kilos.

*Rice (husked).*—The former duty was 63 cents per 100 kilos; present duty, 50 cents per 100 kilos. The total amount of rice, husked and unhusked, imported into this port has increased from 194,500,000 to 340,000,000 pounds.

*Comparative summary of imports into the Philippine Islands, by countries, during the two fiscal years ending June 30, 1903.*

[Duties and values stated in United States currency.]

Countries.	19 2.		1903.	
	Values.	Duties.	Values.	Duties.
United States .....	\$4,035,243	\$912,525	\$4,108,944	\$842,568
England .....	4,877,911	1,303,702	4,903,270	1,340,742
Hongkong .....	9,833,748	146,407	1,574,463	206,779
East Indies, British .....	3,721,597	654,231	2,237,382	563,731
East Indies, French .....	3,244,329	573,071	5,629,093	902,402
Chinese Empire .....	2,680,934	737,841	4,717,617	1,001,478
Spain .....	2,396,611	703,386	2,621,196	729,471
Germany .....	2,356,548	515,542	1,998,922	556,706
French China .....	1,599,705	305,982	1,505,558	219,965
France .....	1,524,638	256,998	1,182,901	334,440
Japan .....	922,269	272,927	701,347	241,571
Switzerland .....	882,651	198,018	480,612	122,149
Scotland .....	645,490	140,585	259,885	61,503
All other Asia—Siam .....	527,645	79,918	632,993	86,628
British Australasia .....	526,054	48,986	618,140	40,795
Belgium .....	243,224	57,310	218,985	54,181
Russia .....	231,611	144,139	286,856	133,888
British China .....	201,537	14,962	4,019	964
Italy .....	186,116	60,366	149,512	50,490
Netherlands .....	158,684	86,922	163,405	117,801
Austria .....	126,076	30,990	105,089	32,764
Dutch East Indies .....	77,765	20,500	88,105	23,038
British Columbia .....	29,576	5,538	7,717	3,763
Mexico .....	25,000	—	875,245	—
Quebec, Ontario, etc .....	22,535	13,625	7,421	4,453
Ireland .....	8,447	2,084	8,577	2,336
Denmark .....	5,145	749	6,734	766
West Indies, British .....	3,736	1,191	29	32
Sweden and Norway .....	3,426	275	5,133	757
Korea .....	937	71	276	42
Egypt .....	3,242	1,740	3,761	1,904
Portugal .....	729	351	295	180
Guam .....	656	203	—	—
Gibraltar .....	783	227	—	—
Turkey in Europe .....	257	361	—	—
All other Asia—Arabia .....	150	186	—	—
Cuba .....	23	3	105	148
French Oceania .....	5	3	—	—
French West Indies .....	1	—	—	—
Brazil .....	—	—	24	3
Canary Islands .....	—	—	295	81
Grand total .....	41,105,034	7,291,916	35,099,842	7,678,948
Total free of duty .....	11,225,894	—	3,765,843	—
Total dutiable .....	29,879,140	—	31,333,999	—

NOTE.—The foregoing is a summary from the recapitulation sheets of monthly reports on Form 3 for all ports of the Philippine Islands.

It is shown that the value of imports for the fiscal year 1903 falls \$6,005,192 short of the value shown for 1902. This shrinkage is more than accounted for by the difference in the quantity of silver imported, the importation of silver for 1902 being \$8,652,648, as against \$1,933,435 for the year 1903, the falling off of silver being \$6,719,213, or \$714,021 greater than the shrinkage in total values for the year 1903. Import duties for 1903 show an increase of \$387,032 over the amount collected during the year 1902.

Government free entries and Government stores arriving on transports not included in foregoing statement.

The abnormal import values shown for Hongkong in 1902 are explained by the fact that nearly all silver coin came from that port.

*Summary of imports into the Philippine Islands, by ports, for the five fiscal years ending June 30, 1903.*

[Values represented in United States currency, gold and silver coin included.]

Ports.	Twelve months ending June—				
	1899.	1900.	1901.	1902.	1903.
Manila	\$12,914,818	\$20,839,174	\$28,586,988	\$36,603,898	\$29,097,688
Iloilo	429,418	1,235,445	2,336,918	1,931,800	2,582,890
Cebu	302,181	850,988	1,430,363	2,093,625	2,895,092
Jolo		84,429	326,295	249,693	274,801
Zamboanga		14,326	80,597	155,198	249,371
Siassi		19,494	57,250	38,524	
Total	13,637,417	23,043,856	32,818,411	41,072,738	35,099,842

*Comparative summary of exports from the Philippine Islands, by countries, during the two fiscal years ending June 30, 1903.*

[Duties and values represented in United States currency.]

Countries.	1902.		1903.	
	Values.	Duties.	Values.	Duties.
United States	\$7,871,738	\$286,916	\$13,863,059	\$619,418
England	8,280,478	339,053	8,799,329	449,273
Spain	869,875	97,212	757,500	89,807
Hongkong	5,799,123	83,442	7,303,234	76,688
Japan	1,346,517	27,032	1,59,366	55,597
France	955,828	23,788	3,684,116	120,690
British East Indies	672,614	13,169	994,400	16,867
British Australasia	436,530	12,953	336,251	15,133
Chinese Empire	295,322	6,965	649,502	10,344
British Africa	122,073	4,410	12,092	297
French China	120,180	3,372	93,353	2,797
Austria-Hungary	88,787	20,587	162,197	21,233
Germany	75,626	1,881	306,664	8,676
British China	55,191	1,894	394,258	294
Belgium	46,829	2,565	137,103	8,373
East Indies, Dutch	27,442	807	25,198	1,029
Netherlands	20,212	1,203	44,061	4,199
Italy	17,830	324	13,177	196
Quebec, Ontario, etc	7,679	108	6,157	118
Gibraltar	6,812	224	9,499	284
Russia	12,128	319	28,417	811
Scotland	3,721	59	2,787	40
Hawaiian Islands	3,687	63	5,910	135
British Columbia	3,648	66	2,030	41
All other Asia—Siam	3,003	42	128,332	109
Guam	2,481	14		
German Oceania	1,934	1		
East Indies, French	1,578	29	109,317	172
Korea	1,400	22	710	12
Aukland Islands	1,310	24	130	2
Uruguay	1,246	234	2,700	570
Switzerland	1,008	17	457	10
Russian China	905	12	578	9
Turkey in Africa—Egypt	889	16	1,952	68
Guatemala	411	8		
Canary Islands	321	18	4,128	356
All other Asia—Arabia	167	2		
Argentine Republic	150	20	599	79
Aden	140	1	718	10
Bermuda	119	4		
All other Asia—Persia	95	1		
Malta, Gozo, Cypress	48	1	2,970	93
Greece	7			
Nova Scotia, New Brunswick			4,684	275
Paraguay			480	115
East Indies, Portuguese			163	1
Spanish Africa			900	49
Spanish Oceania			30	
Portugal			24,775	1,597
French Africa			1,035	24
Total	27,157,087	927,978	39,674,328	1,505,891

NOTE.—The foregoing is a summary of monthly reports on Form 4, Exports by Articles and Countries, in which forms fractions of dollars are omitted. In this report wharfage and harbor dues are included as export duties. On Form No. 1 these items are given separately, and import duty proper only given under that head.



*Exports from Philippine Islands, five fiscal years ending June 30, 1903, by ports.*

[Values expressed in United States currency.]

Ports.	Twelve months ending June—				
	1899.	1900.	1901.	1902.	1903.
Manila -----	\$13,692,592	\$17,180,846	\$21,522,444	\$20,462,688	\$29,570,375
Iloilo -----	1,782,632	2,075,244	1,512,046	2,517,814	4,108,028
Cebu -----	616,078	2,377,506	3,093,714	3,913,297	5,614,245
Jolo -----		99,995	230,872	128,832	209,223
Zamboanga -----		4,041	25,090	103,320	172,457
Siassi -----		28,808	47,096	31,136	
Total -----	16,041,302	21,766,440	26,431,262	27,157,087	39,674,328

NOTE.—Government free entries not included.

The Secretary of Finance and Justice in his annual report, dated November 1, 1902, eleven months and fifteen days after the new tariff went into effect, states:

There has been nothing developed by the working of the new tariff law to indicate that on the whole, and with a view to final results, the tariff adopted was not such as ought to have been adopted. Individual paragraphs appear to have imposed too high or too low a duty, but in general the theories upon which the tariff was constructed seem now to have been wise and for the best interests of the Islands.

## Chapter XVII.

### ECONOMIC CONDITIONS.

**Few wealth-producing interests developed—Hemp—A hemp plantation—Manila tobacco and cigars—Importation of rice—Cost of rice culture—Sugar—Ancient industries—Textiles—Business in hands of foreigners—Professions—Chinese merchants—"Real Compañía de Filipinas"—Taxation—Currency—Coinage Act—Bank statements—Rates of interest—Franchises.**

This chapter, as it aims to touch upon the principal features of economic conditions, is certain to be more or less of a repetition of subject-matter found elsewhere, and topics that are merely touched upon in their relation to the whole may be found more fully discussed in other chapters.

It is passing strange to a progressive people that with the almost unlimited natural resources of the Philippines there is so little diversity of wealth-producing interests. The greater portion of the natives when employed engage in agricultural pursuits under such toilsome and primitive methods that the labor expended is out of all true proportion to the results obtained. This condition applies less, however, to the growing of hemp. The productiveness of the volcanic soils is such that the Islands enjoy a practical monopoly of the world's hemp markets. The fine, pliant fiber common to the so-called Manila product defies competition and has no successful imitator. Without it that great piece of labor-saving mechanism, the American reaper and binder, becomes inoperative, and because of it the Philippine balance of trade is made to assume a more inviting aspect. Some writers attribute in part at least the superiority of Manila hemp to the methods of its stripping and curing; however that may be, there is a pleasant and lucrative field for inventive genius in contemplation of possible mechanical aids to this industry.

Manufacturers of cordage and wheat growers the world over will remember their comparative recent feelings of alarm that the closed ports of the Philippines might be the means of so curtailing the hemp supply that their several industries might be paralyzed. These threatening conditions were brought to the attention of the administration at Washington and the military authorities were directed to use every endeavor to open the ports of the hemp districts. Joint military and naval expeditions accordingly soon occupied the principal shipping points for hemp and the threatened crisis was averted. Mr. Foreman in his work on *The Philippine Islands* makes the following estimate for a planta-

tion of 1,736 acres of land in Albay Province, the most favorable for hemp culture:

*Invested capital.*

500 pisosones of land over 2 years planted .....	\$50,000.00
Store for 5,000 piculs of hemp with ample spare space .....	3,000.00
Bale press and shed for pressing 100 bales per day .....	2,500.00
Plot of land for store and sun-drying ground .....	700.00
2 horses and vehicle .....	300.00
Unrecoverable advances to 100 men, at, say, \$10 .....	1,000.00
Total .....	57,500.00

*Working expenses.*

Salaries .....	\$5,052.00
Labor in pressing bales .....	468.75
Depreciation of press value (8 per cent) .....	200.00
Waste and other loss of hemp .....	363.50
Fire insurance .....	110.00
Office and traveling expenses .....	350.00
Taxes of all kinds .....	1,000.00
Keep of 2 horses .....	96.00
Freight to Manila, loading, discharging, storage, and brokerage .....	2,109.75
Total working capital .....	9,750.00

Half of the total output of such a plantation, which Mr. Foreman estimates at 5,000 piculs, belongs to the plantation; the other half is purchased from the laborers. There are three grades of hemp commercially of which it is estimated 80 per cent is of the first or "corriente" grade, 10 per cent of the second or "segunda" grade, and the remaining 10 per cent of the third or "colorada" grade. The sale of the output is then estimated as follows:

2,000 piculs, at \$8.50; 250 piculs, at \$7.75; 250 piculs, at \$7.25 .....	\$20,750.00
Gain in price on 2,500 piculs (laborer's share) bought at \$1.50 per picul less than Manila market rate .....	3,750.00
Manila firms pay \$1 per bale for pressing .....	2,500.00
Total .....	27,000.00

*Result.*

Sale in Manila .....	\$27,000.00
Deduct working expenses .....	9,750.00
Profits, or approximately 25 per cent on the capital invested .....	17,250.00

No other leaf save the Cuban or so-called "Havana" enjoys preference among smokers over the "Manila" cigars. In 1871 the cultivation and sale of tobacco was declared a state monopoly and so remained until 1882, forming in the meanwhile an important item of public revenue. The total population of tobacco-growing districts and dependent on the industry during the last year of the monopoly (1882) is given as 785,000, a considerable proportion of the entire population of the Islands at that time.

Rice forms the principal item in the subsistence of the natives, notwithstanding which fact, however, its consumption considerably exceeds its production. Statistical information relative to importations during the Spanish régime are meager and entirely unsatisfactory, though fragmentary details available would seem to indicate that under normal conditions and for a period at least there were considerable exportations of this commodity to China. It is known that the acreage under cultivation has been decreased to one-fourth as an incident to war, cholera, rinderpest, and surra. Importations of rice are shown by the reports of the Insular Bureau to have been as follows: For the calendar year 1901, 376,211,389 pounds; value, \$5,108,841; and 1902, 639,460,077 pounds, value \$8,784,388. Of these amounts, and during the calendar year 1902, 412,894,601 pounds were received from the French East Indies and 177,090,981 pounds from China. For a time and in order to prevent famine the Philippine Government was obliged to import rice in large quantities and sell the same to the people at cost. The methods of cultivation of rice in the Philippines is in many respects similar to that practiced in China, Japan, India, and other oriental countries where labor is cheap. The probable economic prohibition against the introduction of advanced methods and the consequent failure of occupation of a greater portion of a crowded population dependent upon the soil, which will apply to China and other competitors, loses its force of argument in the Philippines of a population of only about 7,000,000 to an area equal in extent to the whole of New England and the State of New York. It is even fast becoming a necessity, as wages increase under American standards, to introduce improved methods in order to increase productive capacity necessary for competition with foreign rice. As an illustration, it is stated that while the Filipino laborer now only receives \$20, gold, per annum, and board and a Louisiana laborer \$200, gold, and board, yet the former, impeded in part at least by crude methods, while receiving one-tenth the wage of the latter, produces but one-hundredth of the rice. The Philippine Bureau of Agriculture gives the following estimate for the installation of a modern 500-acre rice farm:

20 mules.....	\$3, 000. 00
3 twelve-inch gang plows.....	135. 00
3 disk harrows.....	60. 00
3 smoothing harrows.....	45. 00
3 twine binders for harvesting.....	450. 00
1 thresher and traction engine.....	1, 250. 00
<b>Total.....</b>	<b>4, 940. 00</b>

A thresher can be made to thresh the rice of 1,000 or 1,500 acres and it is simply necessary to increase the number of mules and the proper multiple of implements as above. The gross receipts for a crop of a 500-acre farm will vary in the United States from \$15,000 to \$20,000, gold,

according to the amount of red rice found in the paddy. No reason is seen why, with proper methods of irrigation and drainage, these results can not be duplicated or even bettered in the Philippines.

The Filipinos are expert and fearless fishermen, and the pearl and mother-of-pearl industries of the Joló Group represent a substantial income and under proper and scientific methods it is believed will materially increase the commercial worth of those islands.

Fortunes have been made in the cultivation of sugar cane, but the active competition of subsidized beet sugar has steadily decreased the production of cane sugar and has greatly lessened the profits of its cultivation. In the Province of Pampanga the growing of cane is still an important industry. Mr. Foreman, however, is optimistic and says that the prime cost of Iloilo superior (assorted) raw sugar delivered at the Iloilo market is \$26.84 a ton and that the margin of profit between the cost of production and the Iloilo selling price in the year of greatest depression (1885) was 15 per cent on capital invested.

The cultivation of coffee, maize, cacao, copra, and other products whose utility have been mentioned in the chapter on "Agriculture" employ the attention of a greater part of the population who are not engaged in the growing of the more commercially important staples herein discussed.

But little has been done by Spain to foster the industrial arts, and the mechanical trades have few representatives among the populace. The Chinese have been better instructors in this respect. They taught the Filipinos, among many other useful cults, the extraction of saccharine juice from the sugar cane, the manufacture of sugar, and the working of wrought iron. They introduced into the colony the first sugar mills with vertical stone crushers and iron boiling pans. It is stated that as early as the landing of Legaspi the natives had cannon and were versed in their making. They still make their own fireworks and gunpowder, and it is more than probable that they received their first knowledge of these arts from the Chinese. Cigars and cigarettes are the principal manufactured export staples. A limited amount of cordage made of native hemp and hats made of straw or finely split bamboo go to swell the exportations. In the Provinces of Bulacan and Pampanga split cane and nito (*lygodium*) hats, straw mats, and cigar cases are manufactured. Some of the finest worked cigar cases require such time and care that they are exceedingly expensive. In Iloilo and Antique cloths of selected hemp fiber (*sinamay*), pure pineapple leaf fiber (*piña*), and mixed pineapple leaf and silk (*jusi*) are made and are having an increased sale. The Ilocos Provinces and Taal in Batangas Province engage with considerable profit in the manufacture of woolen and dyed cotton goods. Among other commodities fabricated may be mentioned a rude pottery, wooden clogs and native leather shoes, jewelry of various kinds, ornate embroidery, bamboo furniture, buffalo-hide leather, alcohol, wax candles, soap, and a number of articles of woven straw, bamboo, and grasses.

At the Philippine Exposition of 1887 there were more than 300 exhibitors of textiles, and one of them showed 145 different kinds of cloth.

As yet these industries do but little to increase exportations, but, being intended for local use and consumption, serve a useful purpose in preventing the detraction of capital which would otherwise go to foreign manufacturers.

The business interests of the Islands are not controlled by the Filipinos, but by the Spaniards, English, Germans, and Americans, as well as by the Chinese. Unfortunately, the native evinces little interest and capacity for trade and most of the smaller merchants are Chinamen, with whose methods of frugality and capacity for gain on small margins of profit the Filipino seems unable to compete.

One of the chief complaints of the Filipino people has been that the control of its parishes has been given to foreign members of monastic orders and that the native clergy have been discriminated against by the church. The Army and Navy have never offered an extended field for the ambitions of the sons of the soil. These avenues of employment being closed, more than a proportionate number of the younger members of well-to-do Filipino families have embraced medicine and the law as professions. There are colleges in Manila whose curriculum includes these courses and a few of the young men pursue their studies abroad in universities of repute. Since the American occupation an increasing number of students have been going to the United States to pursue their studies.

The country needs the services of practical civil, mechanical, mining, and electrical engineers in its proper exploitation. For some reason, whether, as it is stated, the profession is not deemed sufficiently dignified, but little effort has been made to prepare its youth to intelligently extend and conduct public and quasi public works and industries of a private character. The people are naturally musical, and some have attained marked proficiency in instrumental music. There are many excellent military bands and some small orchestras in the Archipelago. As vocalists there are but comparatively few who can be considered as having well-trained and agreeable voices.

Until the second decade of the nineteenth century the fiscal affairs of the Filipinos were administered virtually as a commercial dependency of the Mexican colony and communication with the Islands from Spain was only had through State galleons sailing at first from Navidad and later from Acapulco. The service so established was primarily intended to convey the tribute and revenues of Government which for a time were shipped almost entirely in merchandise. For support of the Philippine administration Mexico in return sent a certain percentage of the realized value of the cargo consigned to it. These ships, when necessary, and being the only means of communication, carried Government functionaries, troops, numbers of the clergy, and even private persons. They

were practically the Spanish mail. Surplus space on the galleons was allotted by the issue of boletas—documents which, during a long period, served as a medium of exchange. The issue of these boletas became a source of corruption and abuse to the detriment of legitimate trade. The richness of Spain's galleons attracted the attention and often became the spoil of daring buccaneers of all nationalities. A loss of one of the ships and its cargo was indeed a calamity, for in such event the tribute had to be renewed.

Spain's subjects were not allowed to go in quest of merchandise, but they might buy what was brought to them. The Chinese, notwithstanding the fact of repeated ill treatment and of frequent robbery, were persistent traders and their junks were often in the harbor.

The wares of India and Persia were well and favorably known in the markets of Manila. The jealousy of Spanish merchants succeeded in proscribing, but only for a time, the trade between China and the Philippines in woven stuffs, skein and woven silk, and clothing, except the finest linen.

Commercial competition in the Philippines was practically unknown and it was only the officially favored who prospered.

On March 10, 1785, a charter was granted to the "Real Compañía de Filipinas," with a capital stock of \$8,000,000, in 32,000 shares of \$250 each. By its charter the company was conceded the exclusive privilege of trade between Spain and the Philippines with the exception of the traffic between Manila and Acapulco. The company was in many respects favored by the State and the Sovereign was a substantial shareholder. At this time the prohibition against trade with China and India was withdrawn. These concessions of the Crown in removing hitherto imposed restrictions operated to greatly benefit trade and to stimulate the industries of the Islands. The company, however, was not a marked financial success.

When Mexico declared her independence in 1820 the galleon service was perforce discontinued and communication with Spain through that country ceased. From that time on to the present, restrictions of trade have been gradually abolished and to-day Manila is one of the leading ports of the world and with her commanding geographical position and under proper encouragement may aspire to the commercial supremacy of the Eastern seas.

The Federal party and other political organizations in the Philippines, as well as the only labor organization in the Islands, vigorously oppose the further admission of Chinese. On the other hand, American and foreign merchants complain that the labor to be had is altogether inadequate and the chambers of commerce have sent a representative to the United States to urge an amendment to the present Congressional legislation which extends the Chinese-exclusion act applicable to the United States to the Philippines, on the ground that it is necessary to admit Chinese

for the business development of the country. That the opposition to the admission of Chinese is chiefly due to the competition which the Chinese have offered in the matter of stores trading is obvious to anyone who has looked into the question. The Chinese laborer becomes a merchant within a year or two after he reaches the Philippines and then begins a competition with the Filipino tradesman which in the end drives the latter out of business. Unlimited Chinese immigration would in the end relegate the Filipino to the position which the Malay occupies in the Straits Settlements. Most of the avenues of business would be commanded by Chinamen, as they now are at Singapore, and the Islands would ultimately become rather a Chinese country than a Filipino country.

It is no doubt true that, were the doors opened, it would tend toward a much more rapid commercial and industrial development of the Islands, but not perhaps along the lines anticipated by merchants and others. It has not been possible in Borneo to introduce the Chinaman into the fields; he has declined to become a farmer or a farm laborer, and the same result may be expected in the Philippines.

The development of the Philippines by Chinamen would be at the expense of the Filipino people, and merchants and others who wish to invest in the Islands must take into consideration the fact that labor is likely to be for some time more expensive than in the United States, measured by the product of labor.

The admission of Chinese coolies would present a great argument against the opening by the United States of its markets to Philippine products—a measure in which the Filipinos are deeply interested.

The evidence concerning the efficiency and quantity of Filipino labor is quite conflicting. Major Aleshire and Captain Butt, in the Quartermaster's Department of the United States Army, who have had large numbers of Filipino laborers under their control, were quite successful in managing them and report them more efficient and punctual than the Chinese. The City Engineer of Manila makes a similar report, and speaks well of the Filipino. The manager of the Manila and Dagupan Railway Company states that his road was constructed almost entirely by Filipino labor, except at one time a number of Chinese were brought in for the construction of bridges and piers, but they did not prove satisfactory and Filipinos were substituted. To the objection that wages are absurdly high, there must be taken into account that everything is high in Manila. The cost of living is high and it is not surprising that the cost of labor should have risen.

It is the opinion of Governor Taft that it would not be just to the Filipinos, or a proper course for America in the development of the Islands, to do more than to admit, under reasonable restrictions, a certain limited number of skilled Chinese laborers, who may contribute to the construction of buildings and other improvements, and who at the same



time by their labor may communicate to Filipino apprentices the skill which the Filipino so easily acquires. Such skilled laborers might be admitted under bond of their employers that they shall be returned to China at the end of three or five years, the bond containing a provision that for every Chinaman imported or employed a Filipino apprentice should be employed. Such a provision would probably result in the establishment of shipyards and other enterprises that are at present impossible in the Philippines. The experience of the Government Printing Office at Manila and that of the newspaper offices show that some of the Filipinos really become skilled compositors and experts on the linotype. In the past there was nothing to lend dignity to labor; now, as the laborer comes to appreciate his independence, when he learns work is not a badge of peonage and slavery, when American influences shall make him understand the dignity and importance attaching to labor under a free government, there will no doubt be a marked change for the better both in the supply and character of labor. The conditions of war and disturbances throughout the Islands for the past six years have interfered with a regular life, and where such restlessness prevails industry is apt to be absent, and under the more peaceful conditions that now obtain, and when matters assume their normal condition, the labor situation will gradually improve and there will be no crying demand for an unrestricted importation of alien labor that will never identify itself with the interests of the Islands.

The system of taxation inaugurated by the United States Government in the Islands has been a considerable modification of that employed by Spain. There is something odious to all peoples in a direct or capitation tax. This has been abolished with the exception of the sale of personal cédulas at a nominal cost, resumed upon the express wish of the people. For accounting and statistical purposes the revenues are divided into four principal headings: Customs, postal, internal revenue, and miscellaneous. It is from the funds collected under the first heading that the expenses of administration are for the most part met. It is the purpose of the present Government to lighten the burden of taxation as greatly as possible and to make them as indirectly felt as in the best-governed communities of the United States.

For a considerable period the chief medium of exchange in the Philippine Islands was the Mexican silver dollar (peso) of 416 grains of silver of the fineness of 0.902. In 1897 the Spanish Government issued a distinctive Filipino peso, which circulated side by side with the Mexican silver dollar. This Filipino peso, containing less pure silver than the Mexican dollar, constituted only a small percentage of the amount of silver in use in the Islands.

The exchange value as fixed by the Philippine Commission was 50 cents.

The principal coins in circulation in the Philippines were the Spanish-Filipino silver dollar, half dollar, peseta (20 cents), two copper coins, the cuartos and centavos, and the Mexican silver dollar. Some Chinese and British coins also had a limited circulation. Under an act of Congress approved July 1, 1902 (secs. 76-83), authority was granted to the Government of the Philippine Islands to establish a mint at Manila, to coin certain fractional currency, but failed to establish a standard value. The Commission did not avail themselves of the provisions of this act. Annexed hereto as an exhibit will be found the text of the act which regulates the coinage system of the Islands.

The fixed standard of value established by this act obviates the great loss entailed on merchants and others who were operating under a depreciated and fluctuating currency. No fear is felt, as heretofore, of the exportation of silver currency. A silver dollar is maintained at its proper parity and is always worth just a dollar, but there is no inducement to the speculator to take it out of the country because it does not represent a dollar's worth of silver which would have to be paid for it, and if taken from the Islands would only be worth its face value less the rate of exchange wherever it might be offered for sale. The importance of these safeguards may be seen from the following statements of the importations and exportations of gold and silver for the years ending in June, 1900 and 1901:

Item.	1900.	1901.
Gold:		
Imports .....	\$149,349	\$508,223
Exports .....	1,160,597	305,251
Silver:		
Imports .....	2,293,071	2,030,782
Exports .....	854,775	2,911,063

Through lack of sufficient banking facilities the use of negotiable paper in aid of other exchange medium is not so general as in more commercially active communities.

The metrical system of weights and measures is in authorized use. For relative table of weights and measures see appendix.

The following is extracted from the Annual Report of the Comptroller of the Currency to the second session of the Fifty-seventh Congress:

The Treasurer of the Philippine Islands has transmitted to this office copies of reports of condition of banks and banking institutions doing business therein. The last statements submitted were for the close of the year ended June 30, 1902, and relate to the condition of 11 banks, including branches. The reported capital was \$1,400,000, the deposits \$18,122,866, and the assets \$29,914,489. The cash holdings of these institutions were as follows:

United States, gold, \$407,825; other gold coin, including bullion, \$22,886; United States silver dollars, \$88,680; United States fractional silver and other money not classified, \$73,027. United States notes to the amount of \$1,390,112

were held; Mexican pesos to the amount of \$4,364,066; Spanish-Filipino pesos and half pesos, \$1,531,106, and in other Mexican and Spanish-Filipino currency, \$84,251.

The principal banking of the Islands is conducted by the Hongkong and Shanghai Banking Corporation, the Chartered Bank of India, Australia and China, and the Spanish-Filipino Bank. Since the date of reports transmitted to this office in 1901 the following corporations have engaged in business in these Islands: The North American and Philippine Loan and Trust Company, the American Bank of Manila, the International Banking Corporation, the Guaranty Trust Company of New York. The savings bank and pawn shop is also still in operation at Manila.

The individual statements of all the reporting banks will be found in the appendix. The per cent of interest on loans at times runs up to extortionate rates, and to make matters more unfavorable for the planters there is often accompanying the contract of loan an agreement that the lender shall have the right to warehouse the product and dispose of it, and so collect warehouse commissions and charges. In addition to banks of issue and deposit there ought to be banks for agricultural loans or mortgage and loan companies. The present number of institutions is so small that they exercise practical monopolies upon the several and perhaps upon agreed lines.

Congress has seen fit to impose certain regulations affecting the right of the Philippine Government to grant franchises. These provisions will be found in the act of Congress approved July 1, 1902, appended hereto. The civil corporation has not acquired any great effectiveness under Spanish law, but the ecclesiastical orders have so extended their power and material corporate interests that they have excited considerable opposition from the native element.

## Chapter XVIII.

### TRANSPORTATION.

Position of the Philippines—Population adjacent to Manila—Commerce of the Islands—Ocean traffic—Harbor works—Travel between United States and the Orient—Coastwise trade—Railway system—New lines proposed—Highways—Military roads—Telegraph lines—Cables.

A glance at the geographical location of the Philippine Archipelago will demonstrate that it is in a position to dominate the trade of the Orient. It lies about midway between Japan on the north and the island continent of Australia on the south, while to the west are the countless millions of China, Siam, and the British East Indies, as well as the other islands of the Eastern Archipelago. The Philippines produce many things that these adjacent countries need, and, on the other hand, they are producers of many articles that are consumed in the Philippines. The conditions are ideal for active maritime commerce. They occupy a favored location not with reference to one part of any particular country of the Orient but to all parts. In fact they are the pickets of the Pacific, standing guard at the entrances to trade with the millions of China, Korea, French Indo-China, Japan, and the Malay Peninsula.

More than half the people of the earth live in the countries that may be easily reached from the Philippines. The population and commerce of the countries commercially adjacent to Manila are shown in the following table:

*Commerce and population of countries commercially adjacent to Manila.*

Countries.	Population.	Commerce.
British East Indies.....	287,123,000	\$586,769,000
British Australia.....	4,794,000	556,587,000
China.....	402,680,000	336,189,000
Japan.....	42,708,000	217,650,000
Straits Settlements.....	512,000	207,777,000
Dutch East Indies.....	34,090,000	146,539,000
Russia, Asiatic.....	22,697,000	51,035,000
Philippine Islands.....	8,500,000	41,370,000
Hawaiian Islands.....	109,000	38,200,000
Mauritius.....	372,000	30,662,000
Persia.....	9,000,000	40,530,000
Ceylon.....	3,449,000	35,363,000
Hongkong.....	222,000	30,000,000
Siam.....	5,000,000	44,664,000
Korea.....	10,529,000	10,570,000
French East Indies.....	22,679,000	3,879,000
Total.....	854,464,000	2,377,784,000

Manila is therefore a center for the trade of 854,464,000 people, whose annual commerce amounts to \$2,377,784,000. A part of the enormous trade will no doubt converge at the port of Manila, which will become a distributing point for American goods, which have an enviable reputation all over Asia. Both the Philippines and the United States would be benefited by such an arrangement, and the commercial interests of the latter country are not slow to see their opportunities, and the exports of Manila are growing rapidly where a system of bonded warehouses allow goods to be entered in bond and then permit of their exportation without the payment of the local duties.

The commerce of the Islands is growing by leaps and bounds, for in 1902, when the Government was three years of age, it did \$15,976,729 more business than did the United States at the same age. There are but three custom-houses in the United States that collect more duties than that of Manila.

When the American forces assumed control of Manila there was no direct steamship line plying between the United States and that city, and, aside from the Government transports, goods and passengers going between these lands were obliged to depend upon German, English, or Japanese lines; but later this condition was changed, and now there is direct communication between the United States and the Philippines. The amount of freight passing between the two countries was so far beyond the capacity of the American merchant marine that it became necessary by an act of Congress to allow foreign vessels to engage both in the interisland trade and in the trade between the Islands and the United States. This provision will continue under the present law until July 1, 1904, at which time the same provision will have to be extended or the shipping confined to American or Philippine vessels.

The amount of ocean traffic carried on between the Philippines and other countries may be seen from the following table giving the number of vessels which entered and cleared from the various ports of the Archipelago during the year 1902:

*Foreign vessels.*

Year 1902.	Sailing.				Steam.			
	Entered.		Cleared.		Entered.		Cleared.	
	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.	No.	Tonnage.
January .....	3	3,563	2	3,350	67	85,136	42	80,220
February .....	1	918	7	8,994	63	90,128	61	93,727
March .....	1	783	4	3,502	64	87,723	57	86,849
April .....	1				61	92,561	61	89,495
May .....			1	1,438	63	91,961	55	83,791
June .....			1	1,649	74	108,066	67	100,878
July .....	1	151			66	100,922	60	89,232
August .....	2	2,861	1	1,011	62	88,431	66	107,082
September .....			1	1,399	72	103,742	69	111,189
October .....	3	3,319	3	4,353	70	109,390	71	106,328
November .....	2	1,143	1	1,636	94	134,530	74	111,254
December .....	5	4,361	1	1,048	80	135,763	77	132,000
Total .....	19	17,099	22	28,380	836	1,228,353	760	1,192,045

The wonderful trade and the great cities built up by the British both at Singapore and Hongkong are results in a great measure of the splendid harbor works which at great expense have been constructed at those ports. Commerce will flow along the lines of least resistance, and those places which afford the best facilities for handling freight are the places that will capture and hold the trade of the natives. Ocean highways have been built by nature, but man must devote his talent to providing terminals.

The Philippine Government, therefore, have made large appropriations for the improvement of Manila Harbor, which, when done, will allow both ocean-going and coasting vessels to lie alongside the piers and receive and discharge cargo without the employment of lighters. Extensive improvements are also being made in the harbors of Iloilo and Cebú, which will increase the safety of the shipping at those places and reduce freight charges—a direct benefit to every consumer in the Islands. Commerce will look for freight and improved facilities in a country as rich and new as the Philippines and will stimulate production until an equilibrium is established between the two.

The prospect of increased travel between the United States and the Orient induced the Trunk Line Association (passenger department) to adopt a schedule of domestic trans-Pacific fares one way and also world-round trip, both from New York. This movement was supplemented by the Pennsylvania Railroad Company with a schedule of "round-the-world routes" at minimum through rates, with stop-over privileges for the convenience of the traveling public, officers of the Army and Navy of the United States going or returning, and commercial travelers in the exploitation of American trade.

The following Trunk Line Association tariff, superseding all others, went into effect May 1, 1902. While subject to change, it may be relied upon as a basis of reliable information:

*Domestic trans-Pacific one-way through fares from New York.*

[Via all authorized all-rail routes to San Francisco, thence via Pacific Mail Steamship Co., Occidental and Oriental Steamship Co., or Toyo Kisen Kaisha (Oriental Steamship Co.), or to Tacoma, thence via Northern Pacific Steamship Co., or to Vancouver, and thence via Canadian Pacific Railway Co.'s Royal Mail Steamship Lines.]	First-class, with first-class accommodation overland.	Servants other than Asiatic, with first-class accommodation overland.	Steerage, with second-class accommodation overland.
Yokohama, Japan .....	\$278.50	\$211.85	\$153.75
Kobe (Hiogo), Japan .....	285.70	216.65	157.35
Nagasaki, Japan .....	296.50	223.85	163.35
Shanghai, China .....	303.50	228.50	168.75
Hongkong, China (British) .....	303.50	228.50	168.75
Manila, P. I. (United States), via Pacific Mail Steamship Co., Occidental and Oriental Steamship Co., or Toyo Kisen and Nagasaki:			
Direct .....	303.50	225.00	168.75
Via Hongkong .....	339.50	264.50	204.75
To San Francisco, thence via Pacific Mail Steamship Co. or Oceanic Steamship Co. to Honolulu, H. I. ....	153.50	128.50	-----
To San Francisco, thence via Oceanic Steamship Co. to Pago Pago, Samoan Islands .....	228.75	178.75	-----

*Round trip basing fares from the Pacific Coast.*

[From San Francisco via Pacific Mail Steamship Co., or Toyo Kisen Kaisha (Oriental Steamship Co.), from Tacoma, via Northern Pacific Steamship Co., or from Vancouver via Canadian Pacific Railway Co.'s Royal Mail Steamship Lines.]	First cabin.		Servants other than Asiatic.	
	Four months.	Twelve months.	Four months.	Twelve months.
Yokohama, Japan.....	\$300.00	\$350.00	\$200.00	\$233.35
Kobe (Hiogo), Japan.....	310.80	360.80	207.20	240.55
Nagasaki, Japan.....	327.00	377.00	218.00	251.35
Shanghai, China.....	337.50	393.75	225.00	262.50
Hongkong.....	337.50	393.75	225.00	262.50
Manila, P. I., via Hongkong (see Steamship companies, Hongkong to Manila, one way).....	397.50	453.75	284.00	322.50
Via Pacific Mail Steamship Co., Occidental and Oriental Steamship Co., or Toyo Kisen and Nagasaki direct.....	337.50	393.75	225.00	262.50
From San Francisco, via Pacific, via Pacific Mail Steam- ship Co., or Oceanic Steamship Co. to Honolulu, H. I.....	135.00	-----	90.00	-----
From San Francisco, via Oceanic Steamship Co., to Pago Pago, Samoan Islands.....	225.00	250.00	-----	-----

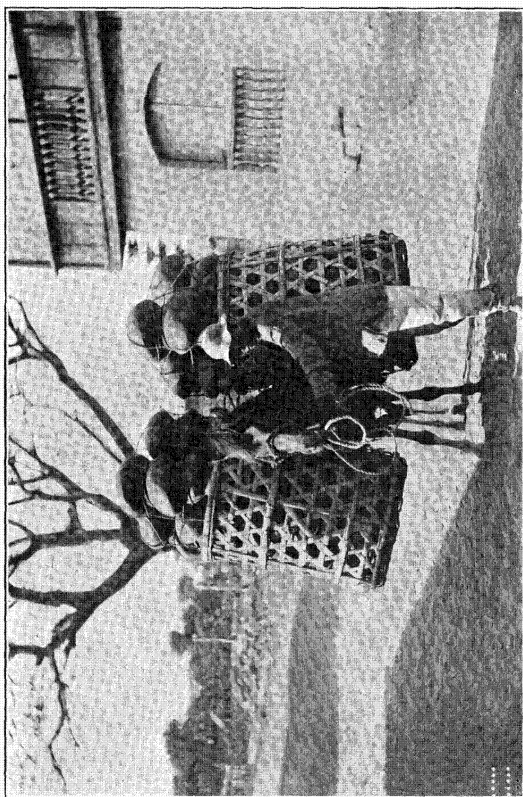
*Stop-overs.*—First-class passengers will be allowed stop-overs at intermediate ports en route.

First-cabin passengers for points beyond Honolulu via San Francisco and Pacific Mail Steamship Company, Occidental and Oriental Steamship Company, or Toyo Kisen Kaisha (Oriental Steamship Company) will be accorded a stop-over at Honolulu and other ports en route, and may proceed thence without extra charge by a steamer of any of those lines. The stop-over at Honolulu via Occidental and Oriental Steamship Company or Toyo Kisen Kaisha (Oriental Steamship Company) is limited to thirty days.

Letter of advice attached to the exchange order for steamship ticket must be properly filled out and immediately forwarded as directed therein.

The following is the list of schedule connecting lines beyond Manila:

Toyo Kisen Kaisha, Nippon Yusen Kaisha, China and Manila Steamship Company, or Indo-China Navigation Company, regular service, Manila to Hongkong; Peninsular and Oriental Steam Navigation Company, Hongkong to London (via Singapore, Penang, Colombo, Aden, Port Said, Brindisi, Marseilles, and Plymouth); American Line (via Southampton or Cherbourg); Anchor Line (via Glasgow or Londonderry); Atlantic Transport Line (via London); Compagnie Générale Transatlantique (via Havre); Cunard Line (via Liverpool); Hamburg-American Line (via Plymouth, Hamburg, or Cherbourg); North German Lloyd Steamship Company (via Bremen, Southampton, Cherbourg, or Genoa, Naples, Gibraltar); Red Star Line (via Antwerp); or White Star Line (via Liverpool), London to New York (direct), total rate, \$642 (add \$36, Manila to Hongkong). Or by the North German Lloyd Steamship Company, Hongkong to London (via Singapore, Colombo, Aden, Suez, Port Said, Naples, Genoa, Gibraltar, and Southampton), or by Messageries Maritimes, Hongkong to Paris (via Saigon, Singa-



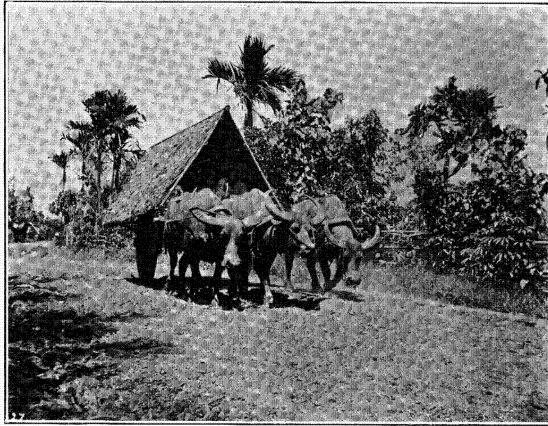
POTTERY DEALER IN TAAL, BATANGAS PROVINCE.



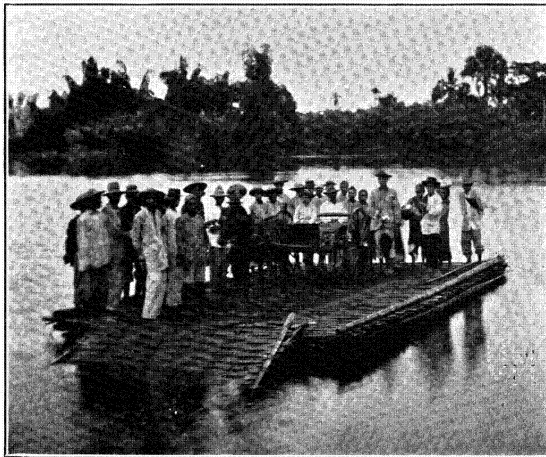
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HEMP CART AT LEGASPI, ALBAY PROVINCE.



BAMBOO FERRY IN ZAMBALES.

2000

pore, Colombo, Aden, Suez, Port Said, Alexandria, and Marseilles); Compagnie Générale Transatlantique, Paris to New York (via Havre).

Under this system tickets are sold at all principal ticket offices of the Pennsylvania Railroad for round-the-world tours, covering transportation via any authorized rail route from New York to San Francisco or Portland, except that San Francisco tickets can not be issued via Canadian Pacific or Minneapolis, St. Paul and Sault Ste. Marie (Soo Line) Railways and Portland. From San Francisco a choice of twelve routes is offered to Chinese, Philippine, Indian, and South Pacific points and thence back to New York. The overland portions of these tickets have all the privileges of unlimited first-class tickets.

A glance at a map of the Philippines will show why the coastwise trade of these Islands is of the greatest importance. The coast line is very long, compared with the area, and the coastwise trade must ever be the most important means of communication.

While there are many elements which are needed to foster the development of the Philippines and place them in the front rank as a prosperous self-sustaining territory, none are more vital than the growth and encouragement of interisland communication. For the purpose of this traffic the Archipelago may be regarded as a little world unto itself, and the islands, provinces, and pueblos as different nations of that world competing for supremacy.

Nearly all modern nations have recognized the importance of reserving to its own people its coasting trade, and the practice of excluding foreign vessels therefrom has been too long recognized and accepted to cause comment or protest. The situation, however, in the Philippines has been peculiar. Before the principle of protection can be applied there must be something to protect, and the task before the present Government is to create a local merchant marine. The demands of trade have passed the capacity of the insular vessels and the Government was obliged to throw this trade open to the vessels of the world.

The importance of the coasting trade may be seen from the following tables, taken from the last annual report (1902) of the Philippine Commission, showing the number of vessels engaged in this traffic:

During the period of American occupation there have been issued at the port of Manila, P. I., 10,127 customs licenses, as follows:

First class, general coastwise trade .....	339
Second-class, coastwise trade covering the Manila customs district.....	1, 129
Lighterage and harbor under the provisions of act of Congress .....	24
Special, for small craft under 15 tons, engaged in the local traffic.....	8, 635
Total .....	10, 127

These figures do not include renewals, but are original licenses representing an aggregate tonnage of 106,760.02 tons.

There are now in force licenses for the following vessels:

	Number.	Tonnage.
Steamers .....	97	26,051.72
Steam launches .....	112	2,145.47
Sailing vessels .....	385	18,570.84
Lighters, lorchas, etc. ....	796	34,228.72
Small craft .....	8,635	15,767.27
Total .....	10,025	96,764.02

The number of first and second class licenses issued at subports is as follows:

	Number of licenses.	Tonnage.
Cebu .....	1,362	14,839
Iloilo .....	541	12,990
Joló .....	8	675
Zamboanga .....	9	807
Total .....	1,920	29,311

At coastwise ports there have been issued about 8,000 licenses to small craft, representing an aggregate tonnage of about 15,000 tons. These vessels are engaged in local traffic, not being licensed to trade at a greater distance than 100 miles from the place of the issuance of the license.

In this connection mention may again be made of the nautical school which prepares natives to engage in marine commerce. The number of pupils is increasing, and the splendid record made by those who have finished their course demonstrated that the system of studies has been wisely planned on practical lines.

An insular territory like the Philippines does not require an extensive railway system, such as would be necessary if the Islands were in one connected body. The Islands of Luzón and Mindanao, however, are large enough to justify the building of railways into the interior, but the latter island has not yet been sufficiently developed, nor do the present demands of commerce make such roads a pressing necessity. As pacifiers and stimulants to development, however, railroads are more potent than regiments, and a wise policy will carefully weigh both present and prospective needs. Luzón, on the other hand, needs more railway facilities. The only railway in the Islands is a line running from Manila to Dagupan, 125 miles long, concluded in 1882. Its general direction is north and south through a very fertile and densely populated country, which was the theater of many of the conflicts between the Americans and insurgents after the capitulation of Manila.

East of Dagupan, the northern terminus of the railway, and separated therefrom by a range of mountains, are the upper waters of the Cagayán River, which flows in a northerly direction through a wide, fertile valley

and reaches the sea at Aparri. This river is navigable for some distance for steamers of light draft. The most pressing necessity at present in the way of improving the railway communications is to extend the Manila and Dagupan Railway east through the mountains to the Cagayán Valley and then down the river to the coast. A reconnoissance has been made, the route is practical, and when completed will place all of the island north of Manila in communication with the capital. It is also suggested that a line be extended north from Dagupan along the west coast of Luzón and another constructed extending southeast into the great hemp-producing region through Tayabas, Ambos Camarines, to Albay.

The first extension mentioned would be of sanitary as well as of commercial importance, as it would afford the people living in the low coast region an easy means of reaching the highlands and salubrious climate of the interior.

There is at present but one street-railway line in the Archipelago and that is at Manila—a badly constructed and poorly managed horse-car line. The climate of Manila is such that riding about the city is a necessity, and, owing to the lack of street-car facilities, almost everyone must have his *carromata* or *quilez*. Oftentimes the streets are blocked with vehicles, and as neither the native coachmen nor horses are noted for patience or suavity of temper, the necessity for improved urban transit became so pressing that a franchise was granted to an American company in the spring of 1903 for the construction of a complete system of electric street railways.

This system is now under construction and must be concluded within twenty-six months after the granting of the franchise; it will afford ample facilities for urban transit, and will add much to the comfort and economy of life in the city of Manila.

The highways between the provinces, towns, and villages on the different islands of the Archipelago are by cart roads, horse trails, or footpaths. On the Island of Luzón, Manila is the center of a system of intercourse by highways constructed with an idea to continuous lines of trade and transportation.

There is one highway which leaves Manila and, passing through Bulacán and Bacolor, divides a short distance beyond the latter point, one line following the course of the Pampanga Grande toward the northeast after entering Nueva Viscaya, crossing to the headwaters of the Cagayán River, the course of which streams it follows to the north to Aparri on the north coast of Luzón. At a point north of Bacolor another line extends in a northwesterly direction to Lingayén, from whence another main highway parallels the entire north stretch of Chinese seacoast to Cape Bojeador on the extreme northwest corner of the island, thence by horse path following the north coast to Aparri. From these trunk lines extend branch roads, horse trails, and footpaths to interior points or to adjacent provinces.



Another road leaves Manila along the Pasig River, parallels the coast of Laguna de Bay, and makes almost the entire circuit of that inland body of water.

At Biñang a highway leaves the main road and extends to the southwest of the Balayán Bay on the south coast. At Calamba another branches off and connects Laguna de Bay with Batangas on a bay of the same name on the south shore. At Santa Cruz another branch road extends into Tayabas, and continues as a highway or trail throughout the entire length of the peninsula of Southern Luzón, terminating at Sorsogon. From this central line, trails branch in every direction to the towns on the different bays, ports, and harbors on the Pacific and Visayan coasts. A portion of the west coast of Negros is paralleled with a highway, broken at short intervals by horse paths. The opposite coasts at several points are also connected by horse paths. Along the coast line of Cebú are also found roads and trails. Bohol also has some good roads and all of the towns are connected by trail. The Islands of Panay has some excellent woods.

In Mindanao the Army has constructed some good highways in the northern part of the island, but roads are scarce in the remaining islands of the Archipelago. A fine military road was built by General Bell in Batangas Province.

Road building in the Tropics, where there are excessive rains, many streams that in a few hours are converted into raging torrents, and where vegetation rapidly throws a network of vines and plants over every excavation, is a serious task, because the bridging, drainage, and road bed must be of the most permanent character. It has been the policy of the Government to perform this work in a thorough manner and during the time of the military régime, as well as since civil government was established, large appropriations have been made for the improvement of highways.

The Signal Corps of the United States Army and the Philippines Constabulary have constructed and laid approximately 10,000 miles of telegraph, telephone, and submarine cable lines in the Philippines since the occupancy by the United States forces, August, 1898, to June, 1902. About one-third of this mileage covered extensive temporary field lines erected for the purpose of maintaining communication between flying military columns and their bases, the latter being always in communication by means of permanent lines with division headquarters, and lines destroyed through hostile operations of the insurgents. The temporary field lines were, in nearly all cases, entirely removed upon the withdrawal of the military forces from the territory occupied. The permanent system embraces 1,327 miles of military cables and 5,000 miles of military telegraph lines, the whole aggregating 6,327. These afford the means of prompt communication and consequent executive control, from Aparri and Bangui, on the north of Luzón, to the Island of Siassi, in the extreme

south and connecting all the important islands of the Archipelago except Paragua. Over this system an average of upward of 10,000 official messages, civil and military, have been handled daily for many months. The operators of both cables and land lines are at present enlisted men of the Signal Corps and of the Constabulary. The linemen in some cases are natives, and schools have been opened for the instruction of Filipinos as operators. Commercial business, in addition to military, is now transacted at 203 of the offices on the Signal Corps lines, which thus serve as feeders to the commercial cables.

All cables and telegraph lines in the Philippine Islands are under control of the United States Signal Corps and the Philippines Constabulary, excepting two wires of the telegraph line along Manila and Dagupan Railway Company's tracks which this company can use for its own purposes only, and the Eastern Extension Company's cable connecting Manila, Iloílo, Cebú, and Bacólod.

In addition to the Signal Corps telegraph and cable systems, the Islands of Luzón, Panay, Negros, and Cebú are connected by the cables of the Eastern Extension Australasia and China Telegraph Company, approximating 610 miles in length, with stations at Manila, Iloílo, Bacólod, and Cebú.

The new American cable from San Francisco, via Honolulu and Guam, to Manila and Japan gives an all-American direct line to the Philippines, reducing cable tolls fully one-third and placing the Philippines in direct communication with the United States.

## Chapter XIX.

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### MANILA.

Location of Manila—Manila Bay—City bridges—Early history—Attacked by pirates—Attacked by the Dutch—Captured by the English—Dewey's victory—Capture of the city—Walled City—Notable edifices—Suburban divisions—Streets—Fires—Botanical gardens—Style of architecture—Manufactures—Cordage—Government of the city—Judicial districts.

Manila is situated on the west coast of the Island of Luzón and on the eastern shore of the Bay of Manila at the mouth of the River Pasig, in latitude  $14^{\circ} 36'$  north and longitude  $120^{\circ} 58'$  east. Manila Bay is located approximately about the center of the coast of Luzón and is large enough to accommodate the fleets of the world. It is nearly circular in shape with a circumference of about 120 miles.

It can be entered by two channels, one on either side of Corregidor Island, the broader being that to the south and is known as Boca Grande while the other is called Boca Chica.

When the westering sun sinks into the waters of the bay, burnishing both sky and sea with great bands of gorgeous color, it forms a picture, once seen, never to be forgotten. A semicircle of verdure-clothed mountains surrounds the plain on which the city stands. To the northeast rises the lofty summit of Angat like a silent sentinel keeping watch over its fellows. To the east is the volcanic range which trends down through the central peninsula of Rizal; to the southeast, in Cavite Province, is visible the conspicuous chain out of which rises a group of peaks known as the Twelve Apostles; westward across the bay may be seen the Sierras de Mariveles, over 4,000 feet high; and to the northwest is the cone of Mount Arayat in Pampanga, over fifty miles away.

The corporate jurisdiction of the city for police purposes extends 3 miles from the shore into the bay and over a zone of 5 miles on the landward side; an area of 20 square miles on land and 12 square miles on water—a total of 32 square miles.

The bay thrusts into the city its long arms, and the river, placid and sluggish ordinarily, during the rainy season sends its greatly increased volume of water to fill the various canal and estuaries which traverse the city. These waterways are spanned by numerous bridges of both ancient and modern construction, most of them less than 20 meters in length, with iron or wooden girders and abutments and piers of masonry. The

most notable and pretentious of these spans is the Bridge of Spain, a solid structure of masonry except the two central spans, which are of iron. The Ayala, an iron-riveted truss bridge, having two roadways and one footway in the center, built during the Spanish régime, and the Santa Cruz, of masonry, cement, and steel, built since the American occupation, are examples of more modern bridge building. There is also the Suspension Bridge for light vehicles and foot passengers; making four bridges in all across the Pasig.

The aboriginal form of spelling Manila was Maynila or Mainila, derived from May-nilad, a native word meaning "There is nilad," a species of plant or shrub which grew in profusion in that locality. Its present form is a corruption, as are many of the names in present use derived from the native tongue.

When Magellan, the circumnavigator, in 1521 reached the Philippines, his attention was directed to the prosperous city of Cebú, as whose ally he eventually lost his life. It remained for his emulator, the able Miguel Lopez de Legaspi, after having established himself in Mindanao by both force and diplomacy, to learn of the desirability of Luzón as a colonial possession.

Accordingly in 1564, having been appointed governor-general of all the lands he might conquer, Legaspi despatched an expedition under command of his grandson, Capt. Juan Salcedo, to the island to investigate the stories of its opulence and, if practicable, to subject it to the authority of Spain. Salcedo was welcomed by the various chieftains he visited, among whom were Lacandola, rajah of Tondo, and Soliman, his nephew and rajah of Manila. These primitive, superstitious, and easily deceived people were readily induced through their awe of the invader to part with their independence and even to aid in the subjugation of their own countrymen should they prove refractory. This pact, extorted under the duress of cunning, was soon repudiated by the young rajah of Manila, who, after setting fire to his capital, was defeated by Salcedo.

Legaspi, having received advice at Cebú of Salcedo's success, set out to join him and soon proceeded in his company to Manila, which he declared to be the capital of those Spanish possessions over which he exercised authority. Work was immediately begun upon fortifications, a residence for the governor, a church and monastery, and barracks for the troops. The city council was constituted on August 20, 1571.

Guido de Lavezares, upon the death of Legaspi, succeeded him as governor-general, and upon Lavezares devolved the defense of the city when, on November 29, 1574, sixty-two armed junks appeared in the harbor prepared for the conquest of this and other established possessions of Spain in the Archipelago. The marauding expedition was under command of Li-Ma-Hong, a redoubtable Chinese pirate, who aspired to establish an empire of his own, with Manila for its capital. It is stated

that his expedition numbered about 6,000 soldiers, sailors, artisans, and women. The latter classes, numbering about 2,000, were intended as a nucleus about which the ambitious Celestial intended to form his civic state.

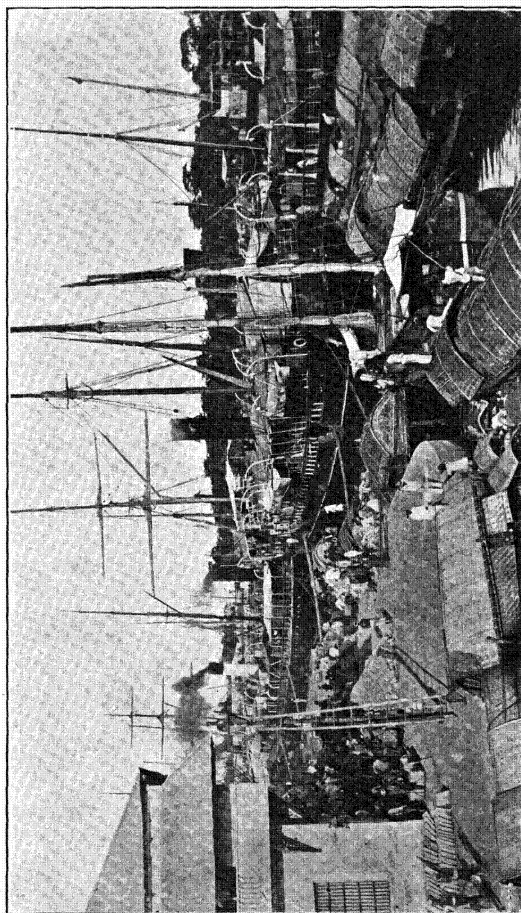
The first attack of the buccaneers—under the leadership of Sioco, a Japanese and trusted lieutenant of the Chinese commander—being in the nature of a surprise, succeeded in gaining access to the city, where they were met by a portion of the Spanish troops under command of Martin de Goiti. After a stubborn resistance the Spanish leader was slain with many of his soldiers. This temporary obstacle to the advance of the pirates was sufficient to enable the governor and the hitherto unengaged portion of the garrison to rush to arms. The next point of attack for the invaders, now flushed with success, was at Fort Santiago, which successfully withstood repeated and vigorous attacks. Disheartened at their failure to reduce the works and fearful of being cut off from their ships, the attacking party retreated in some disorder.

Fortunately, while the Celestials were recovering from the effects of their repulse, Salcedo, the most distinguished soldier of the colony and the real founder of Manila, returned from a northern expedition with reinforcements. On the 3d of December following the besiegers again appeared in the harbor and disembarked in three divisions. After firing outlying districts the first division, under command of the incensed Sioco, succeeded in obtaining a foothold upon the walls. Repeatedly the defenders forced their assailants back and as often again the savage hordes returned to the attack, supported by a cannonading by the reserve forces under command of the pirate chieftain.

Frenzied at the futility of their efforts the entire attacking force hurled themselves against the walls, where they lost their Japanese leader. In vain did Li-Ma-Hong attempt to retrieve his losses, but his best efforts only resulted in the final rout of his followers. The Spanish garrison sallied forth under the leadership of the intrepid Salcedo, who had been the spirit of the defense, and slaughtered many of their opponents in the mad rush for the boats which followed.

This victory was attributed by the religious Spaniards to the intercession of Saint Andrew, who was accordingly declared the patron saint of Manila and in whose honor, each year, high mass is celebrated in the Cathedral on the 30th of November.

After so gallant a defense of its acquired possessions Spain was, however, not allowed to enjoy them in entire peace. Her hereditary enemies, the Dutch, attracted by the richness of the galleons sent out by Spain, harassed commerce for many years. Upon one occasion a Dutch squadron cast anchor in the bay, seizing incoming vessels and destroying the city's shipping. Finally, desperate at its despoliation, the city fitted out a squadron which sailed in search of its enemies. Juan de Silva, the royal governor, commanded this expedition in person. At Playa Honda



SHIPPING IN THE PASIG, MANILA.



the object of their search lay in quiet anticipation of their approach, and for six hours these opposing forces contested for the supremacy of the surrounding seas. The Dutch were overwhelmingly defeated and their vessels, cargoes, and equipment became spoil for the delighted Spaniards.

Other and desultory contests of a similar nature but with varying results covered a considerable period up to the peace of Westphalia in 1648, in which Spain recognized the independence of the Dutch Republic and hostilities between the countries ceased.

War having been declared between Spain and England, Vice-Admiral Samuel Cornish, of the British Navy, received orders to proceed against Manila. Accordingly on August 1, 1762, he set sail from Calcutta in command of the naval forces consisting of seven sail of the line convoying an expedition of British and Sepoy troops in command of Gen. Sir William Draper. During the evening of September 24 the English fleet anchored in the harbor of Manila and on the following morning the admiral sent a demand for the surrender of the city. Upon a refusal, General Draper with a landing force made a demonstration against the city, which was met by a counter display on the part of the garrison. The next day, the 26th, the investment actually began and the attacking forces occupied an abandoned work just outside the glacis of the main fortifications.

On October 4 the shore batteries and the ships in the harbor opened a brisk fire on the city, and by the next day had accomplished a practical breach in the walls. That night a considerable force of natives made a sally and attacked the improvised redoubts of the British, but were repulsed with heavy losses. Panic-stricken at the decimation of their ranks, the natives fled to their villages. At dawn of the 6th a combined attack of land and naval forces carried the fortifications with little difficulty, though the garrison fought with desperation.

The Archbishop, Manuel Antonio Rojo, acting as governor, that office being vacant at the time, arranged for the surrender of the city. The terms of capitulation provided for the free exercise of religion, the security of private property, unrestricted trade between the Spaniards and the natives, English support of the supreme court in its attempts to preserve order, and a payment of \$4,000,000 as an indemnity to the British. It seems that but a portion of this amount was paid.

During the progress of the siege the naval commander received intelligence that the galleon from Acapulco had arrived in the straits, and later despatched two ships for its capture. On October 30th, after a cruise of twenty-six days, the galleon was descried, and on the following day, after a sharp engagement, was captured with a cargo of \$2,500,000 in specie.

The preliminaries for peace were signed at Fontainebleau on the 30th of November. In the meanwhile the affairs of Manila were administered by the British military authorities until, under the terms of the peace of Paris, February 10, 1763, the army of occupation withdrew.



The city did not again become subject to hostile attack or military occupation until August 13, 1898, when the Spanish garrison capitulated to the expeditionary forces of the United States under command of Maj.-Gen. Wesley Merritt.

Growing out of the ineffectual demands of the United States on Spain for some satisfactory adjustment of the deplorable condition of affairs in Cuba, the Congress of the former nation, by act approved April 26, 1898, declared a state of war with Spain to have existed since the 21st of that month. On the 23d the United States consul at Manila was given his passports and left for Hongkong, where he arrived on the 27th. The consul immediately joined the Asiatic squadron at Mirs Bay, then under orders to proceed to Manila and destroy the Spanish squadron known to be there. The same day the squadron weighed anchor and proceeded under its instructions.

On the morning of May 1, 1898, the American squadron under command of Commodore George Dewey, having entered the bay the previous night, engaged the Spanish vessels under command of Admiral Montojo as well as the shore batteries of the arsenal at Cavite. This engagement resulted in the complete destruction of every fighting vessel employed by the Spaniards.

On May 2, 1898, a landing party of sailors and marines destroyed several magazines in the vicinity of Cavite. The day following Cavite Arsenal was evacuated by the Spanish troops and occupied by forces from the American squadron.

On May 25, 1898, the first expedition of American troops sailed for the Philippines, where it arrived on the 30th of the following month, and disembarked at Cavite the next day. General Merritt, under whose command the capture of the city was to be effected, arrived the 25th of July with a second reinforcement to the original expedition. The American troops began now to gradually invest the city, and the throwing up of temporary earthworks drew the attention of the garrison and provoked considerable night firing between the forces.

A joint note of the military and naval commanders, under date of August 7, 1898, made demand of the Captain-General for the withdrawal of noncombatants from the city and served notice of the intention to bombard. This demand was met by the Spaniards with a statement of their inability to comply on account of the presence of insurgent troops and the impracticability of the noncombatants to sustain or defend themselves elsewhere than in the city. To this a prompt demand for the surrender of the city and its defenses was made, and, upon a failure to comply, a joint attack of the land and naval forces was ordered on August 13th. After a desultory action the American troops entered the city and a commission was appointed to arrange the terms of capitulation, under which the military authorities administered the affairs of the city of Manila and its suburbs until the ratification and exchange of the

treaty of Paris, by which the whole Philippine Archipelago passed to the United States.

Manila, in its restricted sense, implies the ancient or walled city, but commercially and popularly its suburbs have long since been accepted as being within the term. The old city is built upon low land. Nature and artifice have conspired to make of Manila Intramuros an island. At the feet of its western walls washes the waters of the bay, along its northern border flows the Pasig, and there are broad, deep moats on the east and south, all of which, and until 1852, when the practice of drawing in its drawbridges was discontinued, contributed to separate, from 11 p. m. to 4 a. m. of each night, the ancient citadel from the world and its progress, of which it took so little note. Within its confines are located the public buildings and offices.

The most notable edifice within the city is the Cathedral. The first building was erected shortly after the founding of Manila, but the recurrent earthquakes with which the city has been from time to time visited have several times caused its entire reconstruction. The present structure, of Roman Byzantine style, is partially on the site of the cathedral destroyed by the earthquake of 1863, and a portion of which yet stands. The new building is large, commodious, and perhaps the most imposing on the Islands. It cost approximately a half million dollars. Within its portals the Archbishop of Manila celebrates mass, and during the Spanish régime it was the scene of many public and official functions of great splendor. In addition to the Cathedral there are eleven other churches of more or less antique origin and tradition. The palace of the Archbishop, various religious convents and monasteries, the University, a number of schools and colleges, the Ayuntamiento Building, used as offices of the General Government, as well as of the municipality, the Intendencia Building, or old Aduana, are all within the walls of the city.

The so-called suburbs of the city are but in reality sections of a municipal unit. Their distinct names have been preserved for the reason that they are an important administrative division. During the Spanish régime they were divided into barangay, or hundreds, whose cabeza, or head, was responsible for the collection of taxes.

Binondo is on the north bank of the river and is opposite the fortified portion, and here are congregated the commercial interests of the city.

Many of the streets are paved and are wider and offer better facilities for travel than those of the old town. The Escolta, the principal street of this section, is the Broadway of Manila and its sides are lined with houses of the more important American and European firms. In Calle Rosario are the Chinese shops, less pretentious in appearance, whose volume of business is not so great. These shops, huddled together in groups of ten or twelve, afford varied experiences in shopping to those unacquainted with oriental methods. Some of them are veritable treasure

troves, where are exposed for sale the curios and mementos which find their way subsequently all over the world and finally repose on wall or in cabinet for the admiration of friends.

The streets of this locality daily present an animated sight. The interest in its cosmopolitan crowds is heightened by sufficient local color. The American, European, Chinaman, and native, in the dress or undress of their own country, throng the streets and lend to the effect of the gayly colored buildings a varied color scheme. Binondo has been extended to include Trozo or San José.

San Nicolás is on the north bank and at the mouth of the Pasig River. It lies between Binondo and the bay, which forms its western boundary.

Tondo lies directly north of San Nicolás and extends along the shore line of the bay. It is the most densely populated of the various suburbs, is the home of the working classes, and distinctively Filipino in its characteristics. It boasts of several public parks and buildings, as well as churches and convents. It has a large market place and a cemetery. The terminal station of the Manila and Dagupan Railway is located here, as well as the terminal of the Manila and Malabón Tramway, a suburban line, of which the motive power is steam. Both these roads are operated by British capital. The houses are generally constructed of bamboo and thatched with the nipa palm. This section suffered from incendiary fires during the attempted uprisings in Manila in the early days of the insurrection, when the insurgents, finding their troops could not cope with the American Army, were hoping to drive the Americans out by this method; in rebuilding, more substantial materials are being used. Extensive fires have from time to time destroyed considerable sections of the nipa-built district of Manila, and as late as May 20, 1903, Trozo, the district of the city on its northern side, was visited by a destructive conflagration. Under Spanish rule but little attention was paid to drainage about the closely grouped huts, and as a consequence Tondo became the abiding place of the various endemic diseases common to tropical countries.

Santa Cruz, north of Binondo, with a narrow frontage on the river, and Quiapo, east of Santa Cruz, are more solidly built and well arranged. In the barrio of Santa Cruz is located the hospital of San Lazaro. It is said to have been founded by the Franciscans in 1578 in order to care for a shipload of lepers sent to Manila by the Emperor of Japan for the twofold purpose of ridding himself of a burden of state and of evidencing his displeasure at the persistent efforts of the monastic orders to turn his loyal subjects from the gods of their fathers.

San Miguel, southeast of Quiapo and extending along the north bank of the river, was formerly the preferred residential section and probably the most prepossessing of Manila's suburbs. Along the banks of the river are many elegant villas, the principal of which, Malacañang Palace, is the

residence of the Governor-General. The palace, occupying the center of a large and well-arranged garden, is a low and massive structure. It has been the home of great pomp and ceremony, and when occupied by the Spanish Governor-General required the attendance of a small army of retainers.

Sampaloc, northwest of San Miguel, is a residence section. Paco is an extensive outlying suburb south of the bend of the Pasig River and opposite San Miguel. Large and prosperous cigar factories are located in this district.

Ermita and Malate occupy the bay front a short distance south of the Murada or Walled City. Ermita is well built, with houses of modern construction, and has attracted a majority of the American families who have located in Manila since the occupation. Within its boundaries are to be found the famous Observatory of Manila and Normal School, both under the direction of the present Government.

When the control of the city passed to the American forces the pumping station, eight miles from the city, was in the hands of the insurgents. They stopped the pumps upon which the inhabitants of Manila relied for supplying their needs, and it was not until August 24 that the station resumed operation. The water is taken from the Mariquina River at that point, thence pumped to a reservoir halfway to the city, from whence it is distributed. The works are owned by the municipality, having been largely paid for with a fund the proceeds of a legacy, left by will of a citizen, Francisco Carriedo, who died in 1743.

There are approximately 79,000 meters of streets in Manila, of which about one-tenth are paved and the balance for the most part macadamized. There are 94,349 square meters of land used as public parks, the largest of which is the Botanic Garden, which heretofore has not received the attention from the authorities that it deserved. It has, however, undergone considerable improvement since American occupation. The Luneta is a popular promenade and driveway along the old sea wall. Here are given the Army and Constabulary band concerts, which are very popular and largely attended. On these occasions the driveway is thronged with victorias and other vehicles, of which the municipal license bureau says there are 30,000 in the city. Here, too, have been enacted many tragedies, as, during the Spanish régime, it was used as a place of public execution.

A number of statues adorn public places, among the most notable being those of Anda, Magellan, Charles IV in Plaza McKinley, Queen Isabela of Spain, and the beautiful monument to Legazpi and Urdaneta, at the north end of the Luneta, which reached Manila just before the outbreak of the Spanish-American war, and was erected by the Provost-Marshal-General of the United States Army in Manila, 1901. Since the American occupation other statues which were found unmounted have been placed on appropriate pedestals.

There are eleven public markets in Manila, controlled and managed by the city government.

The prevailing style of architecture is an adaptation of the Spanish-Moorish. Solidity and imperviousness to the attack of the dreaded white ant dictate the finished appearance and method of construction. Buildings must be low to offer as little resistance as possible to typhoons, and substantially constructed to withstand earthquakes. Wooden beams for supporting roofs are gradually being replaced by iron and steel, as the white ants bore into the former, never appearing upon the surface and giving no warning of their ravages until the beam collapses, letting down the roof with it. Owing to danger from earthquakes corrugated-iron roof plates are taking the place of the more picturesque tiles, which depend entirely upon the framework for support. The houses of the poorer classes are generally of one story; those of the wealthy are generally of two, in which a portion of the lower floor is used not infrequently for a stable. Woods that in other countries would represent a small fortune are lavishly used in the construction of the better classes of residences. In the interior of the houses there are small open courts or quadrangles, termed patios, into which all the rooms open.

The cafés do not form the important part in the social life of the people that they do elsewhere in Spanish-speaking countries. The restaurants for the poorer classes are uninviting, but have the recommendation to their patrons of offering a meal for an astonishingly small sum.

One of the most important industries of the city is the manufacture of Manila cigars, famed the world over, and of cigarettes. Large factories are located at Binondo, Paco, and Tondo. The cigars are made by hand, while for the manufacture of cigarettes French and American cigarette machines are largely employed. Some cordage is made from the famous Manila hemp, but most of the hemp output is shipped to the United States and European countries, where it is made up. Manila hats are beginning to have an increased sale and are even rivaling the Panama, possessing the advantage of greater lightness—a quality of considerable moment in a temperature admitting of their wearing. Basket and kindred weaving offer occupation for many of the natives. The Filipinos have considerable skill as silver and goldsmiths and many of their women become expert in the guild. The women are also expert needleworkers and weavers of the exquisite piña and jusi cloth.

Manila is a federal district somewhat like the capital of the United States. By act of the Philippine Commission entitled "An act to incorporate the city of Manila," and dated July 31, 1901, the government of the city of Manila was vested in a Municipal Board of three members, to be appointed by the Civil Governor, by and with the advice and consent of the Commission. The number of members has recently been increased to five, by making the President of the Advisory Board (mentioned hereafter) and the City Engineer, ex officio members of the Municipal Board.

The Board has certain legislative as well as executive powers. Appropriations for city purposes are made by the Commission upon estimates submitted by the Board, 30 per cent of which is paid from the Insular Government revenues and the balance from city taxes. All moneys collected in the city are paid into the Insular Treasury, and withdrawn only upon warrants issued under appropriations, and accounts of receipts and expenditures are scrutinized and examined by the Insular Auditor. General police powers are vested entirely in the Board.

There is also an Advisory Board provided for, composed of one member from each of the eleven districts of the city, whose duty it is to bring to the attention of the Municipal Board the special needs of the city and its inhabitants and to make suggestions and recommend action in that connection. The Municipal Board may not pass any ordinances fixing license fees, or involving the liability of the city in any sum exceeding \$10,000, or denouncing as an offense the violation of any city ordinance and imposing a penalty and fine or imprisonment therefor, or directing the condemnation of any property for the use of the city, or make any contract for improvements in the city which will probably involve an expenditure of more than \$10,000 dollars, without first having submitted for comment, discussion, and recommendation the proposed ordinance to the Advisory Board. Should the Advisory Board, however, delay action upon the ordinance thus presented to it for more than two weeks the Municipal Board may proceed to adopt the ordinance without waiting for the action of the Advisory Board.

The city of Manila has one municipal or police court and two justice of the peace courts. It speaks well for the peace and good order of Manila that one judge can handle the police business of so large a metropolis. Three judges have been appointed to the Court of First Instance for the District of Manila.

A telephone system extends throughout the city and suburbs. Small distributing trade and minor manufacturing industries are controlled by Chinese. They are shopkeepers, barbers, cabinetmakers, carpenters, tanners, dyers, shoemakers, coppersmiths, and mechanics. Import and export trade is yet largely in the hands of British firms, of which there are over twenty located in Manila, some having been established for many years. Two of the seven banking establishments in the city are branches of well-known American corporations with headquarters in New York, two more are branches of noted British corporations, two are operating on local American and Filipino capital, and one is Spanish. In addition to banking, import, and export trade, there are firms interested in engineering works, ship repairing, and stevedoring, and in rice and sugar mills in the surrounding country. The only railway in the Philippines is the property of a British company. Manila possesses large sugar refineries, distilleries, and rope works. Coach building is also an important industry. There are large cigar and cigarette factories, furnishing em-

ployment to 7,000 female laborers. The manufacture of cigar boxes also offers employment to a number of people. There are four daily papers and one weekly published in English, four daily papers in Spanish only, and five native papers published in both Spanish and Tagalog, or thirteen dailies in all.

A cable connects Manila with Hongkong, and another, through Guam and Honolulu, with San Francisco, from which points communication is open with the whole civilized world. Manila has also numerous cable and land lines which connect it with all points in the Archipelago.

At present imports, in the great majority of cases, are transshipped at Hongkong, 628 miles distant, to vessels sufficiently light of draft to enter the Pasig River, where cargo can be discharged cheaply and in all kinds of weather. The scattered nature of the Islands necessitates the employment of a large fleet of coasting steamers and sailing vessels, varying in size from 800 tons downward. Six British steamers are at present running regularly between Manila and Hongkong, occasionally calling at Amoy, China. Communication with Australia is maintained by a Japanese mail line and two small British lines owned in Hongkong. The British India Company's steamers call every three weeks on the voyage from Calcutta to Japan. These steamers, the Spanish mail steamers, and one or two small German steamers are the only vessels trading direct between Manila and Singapore. The Spanish Transatlantic Company maintains monthly sailings between Manila and Liverpool via Spain, and is the only regular line carrying goods to England without transshipment. There are two lines running from New York to Manila direct and one from Seattle to Manila direct. American transports sail at frequent intervals between Manila and San Francisco, and occasionally between New York and Manila. A large number of colliers are employed conveying coal to Manila from Moji, Japan, and Newcastle, New South Wales. A considerable number of British ships are also engaged with the rice trade with Saigon, Cochin China.

Rice and cotton goods constitute the most important items in the list of imports; the principal articles of export being hemp, sugar, tobacco, cigars, copra, and indigo.

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## APPENDICES.

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- A. Treaty limits of the Philippine Archipelago.
- B. List of islands, provinces, and population of towns.
- C. Table of weights and measures used in the Philippines.
- D. List of Philippine agricultural products and fiber plants, by Prof. F. Lamson-Scribner.
- E. List of Philippine woods, by Mr. Elmer D. Merrill.
- F. List of medicinal plants, by Leon M. Guerrero.
- G. Acts of Congress relating to the Philippines.





## APPENDIX A.

### TREATY LIMITS OF THE PHILIPPINE ARCHIPELAGO.

"Spain" ceded "to the United States the archipelago known as the Philippine Islands, and comprehending the islands lying within the following line:"

*North.*—"A line running from west to east along or near the twentieth parallel of north latitude [lat.  $21^{\circ} 25'$  N., approximately; long.  $118^{\circ}$  E. of Greenwich, in the China Sea], and through the middle of the navigable channel of Bachi, from the one hundred and eighteenth (118th) to the one hundred and twenty-seventh (127th) degree meridian of longitude east of Greenwich." [Length of N. line  $9^{\circ}=540$  geog. m.= $625\frac{1}{2}$  st. m.]

*East.*—[NE. angle of boundary in the Pacific Ocean, lat.  $21^{\circ} 25'$  N. approximately; long.  $127^{\circ}$  E.] "Thence along the one hundred and twenty-seventh (127th) degree meridian of longitude east of Greenwich to the parallel of four degrees and forty-five minutes ( $4^{\circ} 45'$ ) north latitude." [Length of E. line  $16^{\circ} 40'=1,000$  geog. m.=1,158 st. m.]

*South.*—[SE. angle of boundary in the Pacific Ocean, lat.  $4^{\circ} 45'$  N., long.  $127^{\circ}$  E.] "Thence along the parallel of four degrees and forty-five minutes ( $4^{\circ} 45'$ ) north latitude to its intersection with the meridian of longitude one hundred and nineteen degrees and thirty-five minutes ( $119^{\circ} 35'$ ) east of Greenwich." [Length of line  $7^{\circ} 25'=445$  geog. m.= $515\frac{1}{2}$  st. m.]

*West.*—[Lat.  $4^{\circ} 45'$  N., long.  $119^{\circ} 35'$  E., the E. of the SW. angles in the boundary, in the Celebes Sea.] "Thence along the meridian of longitude one hundred and nineteen degrees and thirty-five minutes ( $119^{\circ} 35'$ ) east of Greenwich to the parallel of latitude seven degrees and forty minutes ( $7^{\circ} 40'$ ) north." [Length of W. line  $2^{\circ} 55'=175$  geog. m.=192 st. m.]

*South.*—[Lat.  $7^{\circ} 40'$  N., long.  $119^{\circ} 35'$  E., the central SW. angle in the deflected line NE. of Borneo, in the Sulu Sea.] "Thence along the parallel of latitude seven degrees and forty minutes ( $7^{\circ} 40'$ ) north to its intersection with the one hundred and sixteenth (116th) degree meridian of longitude east of Greenwich." [Length of S. line  $3^{\circ} 35'=215$  geog. m.=249 st. m.]

*West.*—[Lat.  $7^{\circ} 40'$  N., long.  $116^{\circ}$  E., the extreme SW. angle, in the China Sea.] "Thence by a direct line to the intersection of the tenth (10th) degree parallel of north latitude with the one hundred and eighteenth (118th) degree meridian of longitude east of Greenwich." [Length of W. line deflected NE. 205 st. m.]

*West.*—[Lat.  $10^{\circ}$  N., long.  $118^{\circ}$  E.] "And thence along the one hundred and eighteenth (118th) degree meridian of longitude east of Greenwich to the point of beginning." [Lat.  $21^{\circ} 25'$  N., long.  $118^{\circ}$  E.; length of W. line  $11^{\circ} 25'=685$  geog. m.=788 st. m.] [Treaty of peace, December 10, 1898, between the United States of America and the Kingdom of Spain, at Paris.] "As a voluntary consideration, the United States paid to Spain the sum of twenty million (20,000,000) dollars." [Art. III, Treaty.]

Spain also relinquished to the United States all title and claim to the Islands of Cagayán Sulu and Sibutu and their dependencies and all others belonging to the Philippine Archipelago and lying outside the lines described in Article III of that treaty, the United States paying the sum of \$100,000. [Treaty of cession of islands outside of the lines defined in treaty of peace December 10, 1898. Sole article, Washington, November 7, 1900.]

## APPENDIX B.

### LIST OF ISLANDS, PROVINCES, AND POPULATION OF TOWNS.

[Under the Spanish census, 1887, estimated population not counted, total population, and number of towns; also subdivided by provinces under the same classification.]

Islands or groups.	Area.	1887 popu- lation, Spanish census.	Estimated population not counted.	Total popula- tion.	Towns.	1903 popu- lation, American census.
	<i>Sq. m.</i>				<i>No.</i>	
Luzón .....	44,253	3,679,219	48,269	3,727,488	570	3,726,342
Marinduque .....	681	48,000		48,000	6	
Mindanao .....	46,721	138,924	356,735	495,659	130	
Mindoro .....	4,108	67,656	38,544	106,200	19	31,331
Palawan (Paragua) .....	5,037	2,100	50,250	52,350	14	28,960
Sulu Archipelago .....	1,029	22,630		22,630	14	
Visayan Islands .....	25,302	2,486,205	10,000	2,497,908	381	2,915,550
Unassigned .....	740	16,338	8,500	24,838	3	
<b>Total</b> .....	<b>127,853</b>	<b>6,462,875</b>	<b>512,298</b>	<b>6,975,073</b>	<b>1,137</b>	

Total population of the Archipelago ..... 6,975,073  
 Total area ..... sq. m. 127,853  
 Number of inhabitants per sq. m. .... 54.55+

Islands and provinces.	Area.	1887 popu- lation, Spanish census.	Estimated population not counted.	Total popula- tion.	Towns.	1903 popu- lation, American census.
	<i>Sq. m.</i>				<i>No.</i>	
<b>Luzón</b> .....	<b>44,253</b>	<b>3,679,219</b>	<b>48,269</b>	<b>3,727,488</b>	<b>570</b>	<b>3,726,342</b>
Abra .....	1,484	41,300	2,000	43,300	11	37,928
Albay .....	997	195,129		195,129	23	
a. Catanduanes .....	704	33,010		33,010	29	235,798
Ambos Camarines .....	3,161	194,022		194,022	44	233,183
Bataan .....	436	50,761		50,761	12	43,606
Batangas .....	1,108	311,180		311,180	22	258,802
Benguet .....	990	15,175		15,175	8	917
Bulacán .....	841	239,221		239,221	25	220,289
Cagayán .....	5,031	85,408		85,408	22	
a. Babuyanes .....	179	1,284		1,284	5	
b. Batanes .....	81	8,776	899	9,675	8	143,438
Cavite .....	610	134,569		134,569	23	134,394
Ilocos Norte .....	1,265	163,349		163,349	15	176,717
Ilocos Sur .....	491	215,792		215,792	22	171,619
Isabela .....	5,395	48,302	( <sup>1</sup> )	48,302	22	69,076
Laguna .....	752	169,983		169,983	33	147,660
Lepanto-Bontoc .....	1,712	30,137		30,137	8	
a. Quiañgán .....		30,000		30,000	6	2,413
Manila, municipal .....	20	250,000		250,000	1	219,941
a. Corregidor .....	4	420		420	1	
Nueva Ecija .....	3,840	156,610		156,610	28	132,271
Nueva Vizcaya .....	1,075	19,379	39,000	58,379	8	
a. Cayapa .....		2,249		2,249		16,071
Pampanga .....	2,209	223,922		223,922	25	218,766
Pangasinán .....	1,316	302,178		302,178	29	397,443
Rizal .....	1,048	246,940		246,940	34	143,422
Sorsogón .....	675	98,650		98,650	16	120,145
Tarlac .....	1,295	89,339		89,339	17	135,397
Tayabas .....	2,334	109,780		109,780	23	149,289
a. Infanta .....	877	9,095		9,095	2	
b. Polillo .....	294	1,700		1,700	1	
c. Principe .....	1,218	4,100	6,370	10,470	7	
d. Marinduque .....	681	48,000		48,000	6	
Unión .....	867	110,164		110,164	14	127,966
Zambales .....	2,210	87,295		87,295	26	100,953

<sup>1</sup> An estimate of 14,000 for former comandancia of Saltán would make 62,302 for province not counted.

Islands and provinces.	Area.	1887 popu- lation, Spanish census.	Estimated population not counted.	Total popula- tion.	Towns.	1903 popu- lation, American census.
	<i>Sq. m.</i>				<i>No.</i>	
Mindanao -----	46,721	138,924	356,735	495,659	130	-----
Basilan -----	354	( <sup>1</sup> )	8,000	8,000	4	1,331
Cottabato -----	8,344	4,148	-----	4,148	6	1,716
Dapitan -----	2,386	17,273	3,000	20,273	5	17,331
Dávao -----	9,171	-----	33,668	33,668	21	20,458
Lanao -----	3,900	-----	100,000	100,000	8	?
Misamis -----	5,879	( <sup>2</sup> )	126,942	126,942	44	138,329
Surigao -----	13,201	( <sup>3</sup> )	85,125	85,125	30	98,714
Zamboanga -----	3,486	117,503	( <sup>4</sup> )	117,503	12	20,682
-----	-----	-----	-----	-----	-----	-----
Mindoro -----	4,108	67,656	38,544	106,200	19	31,331
Palawan -----	5,037	2,100	50,250	52,350	14	27,481
Palawan (Paragua) -----	4,726	( <sup>5</sup> )	50,000	50,000	10	1,479
Balábac -----	264	2,100	-----	2,100	3	-----
Cagayán de Sulu -----	47	-----	250	250	1	28,960
St. Michaels Islands -----						
Calamianes -----	677	16,338	-----	16,338	1	-----
Cuyos -----	63	-----	8,500	8,500	2	-----
-----	-----	-----	-----	-----	-----	-----
Sulu Archipelago -----	1,029	22,630	( <sup>6</sup> )	22,630	-----	?
Balanguingui (group) -----	38	-----	<sup>7</sup> 335	-----	-----	?
Parigutaran (group) -----	72	-----	<sup>7</sup> 1,815	-----	-----	?
Sulu (Joló) (group) -----	380	-----	<sup>7</sup> 14,415	-----	-----	1,273
Tapul (group) -----	77	-----	<sup>7</sup> 1,300	-----	-----	?
Tawi Tawi -----	462	-----	<sup>7</sup> 4,765	-----	-----	168
-----	-----	-----	-----	-----	-----	-----
Visayan Islands -----	25,302	2,486,205	10,000	2,497,908	381	2,915,550
Bohol -----	1,614	260,000	-----	260,000	37	268,394
Cebu -----	1,782	518,032	-----	518,032	52	651,621
Leyte -----	4,214	270,491	-----	270,491	50	389,256
Masbate: -----	-----	-----	-----	-----	-----	-----
a. Burias -----	268	<sup>8</sup> 1,703	-----	1,703	1	44,045
b. Masbate -----	1,315	21,366	-----	21,366	13	
c. Ticao -----	149	( <sup>9</sup> )	-----	-----	4	
Negros Occidental } Negros -----	3,112	231,512	-----	231,512	30	309,959
Negros Oriental } -----	1,742	140,498	-----	140,498	24	186,397
Antique -----	1,340	115,434	-----	115,434	51	133,674
Cápiz -----	1,661	224,000	-----	224,000	33	224,581
Iloilo -----	2,102	433,462	-----	462,444	48	399,256
Romblón -----	515	<sup>10</sup> 38,982	-----	-----	6	52,858
Samar -----	5,488	55,339	-----	55,339	32	263,509
-----	-----	185,386	10,000	195,386	-----	-----
Unassigned -----	740	26,338	8,500	24,838	3	?

<sup>1</sup> The Spanish census gives the enumeration 1,119; the church (1895) gives the enumeration 1,421 the town of Isabela has an enumeration 6,000. (Eastern Arch., Pt. I.) Other expert authority, 8,000.

<sup>2</sup> In 1897 the population of Misamis as then constituted was 169,256. It is estimated that about one-fourth of that number occupy the region outside the new boundaries, leaving the above number a fair estimate of the population within the new boundaries.

<sup>3</sup> The census of 1887 gave 67,760 population; official figures (1898) gave 85,125, exclusive of the wild races of the mountains.

<sup>4</sup> In 1897 an enumeration gave 19,503 Christians in Zamboanga and surrounding towns; 8,000 Mohammedans, and 90,000 estimated in the unexplored regions of Sibuguey.

<sup>5</sup> Official, 1887, certain towns, 5,985. Another authority (Arguelles, former governor), Christians in N., 10,000; Mohammedans in S., 6,000. Other experts, 28,000 to 30,000. Population of native races estimated, Tagbantias, 6,000; Negritos, 1,500; Manguianes, 4,000; Tandulanos, 1,500. A round estimate of 50,000 may be regarded as conservative.

<sup>6</sup> Official guide of the Philippines, 1897, population of Sulu Archipelago, 22,630.

<sup>7</sup> Ferreiro gives these figures of fighting men governed by datos or Panlimanes in the groups named. An expert estimate of a population of 200,000 in the Archipelago of Sulu is given as not excessive.

<sup>8</sup> Another authority gives the population at 11,000 in 1875.

<sup>9</sup> See Masbate.

<sup>10</sup> This represents the population in 1897 of Concepción district, now Iloilo.

*Pueblos (towns) in the Philippine Islands.*

[An alphabetical list of pueblos (town and townships), with the population of each, under the census of 1887 and estimated population 1898-99 for educational purposes, together with the island or province in which situated. A pueblo corresponds rather to a township or a county than to a "town," in the ordinary acceptation of that term in the United States. It embraces an area often of many square miles, through which are scattered small villages, known as "barrios." The census population here given for 1887 and estimate for 1898-1900 therefore represents the number of inhabitants, not only of the (pueblo) name community (town or village) but of the surrounding "barrios" or districts recognized as appurtenant thereto for local administration, educational, or other purposes.]

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Abra de Ilog	Mindoro	1,272	1,161
Abúcaý	Bataán	7,185	4,798
Abúlug	Agayán de Luzón	5,880	6,290
Abundao	Benguet		271
Abúyog	Leyte	9,112	
Adaoy	Benguet		681
Agaña (Guam)*	Marianas		6,185
Agno	Zambales	5,002	4,561
Agoó	Unión	10,050	9,094
Agua	Bontoc		251
Aguilar	Pangasinán	4,412	4,223
Agusan	Misamis	934	1,113
Agutaya	Cuyos (Calamianes)	2,046	2,196
Ajuy	Iloilo	1,000	9,388
Alaminos	Laguna	4,600	4,666
Do	Zambales	8,008	6,528
Alang-Alang	Leyte	8,602	6,103
Alap	Bontoc		682
Alava	Pangasinán	6,100	4,153
Albay	Albay	34,000	11,672
Alberique	Dávao		
Albuera	Leyte	4,555	2,830
Alburquerque	Bohol	6,604	6,093
Alcalá	Agayán de Luzón	5,471	5,056
Do	Pangasinán	8,624	9,016
Alcántara	Cebu	4,080	3,261
Alcoy	do	5,040	2,658
Alegria	do	11,460	8,877
Alfonso	Cavite	7,660	7,026
Alfonso XII	Abra		
Alfonso XIII	Tayabas		
Aliaga	Nueva Ecija	17,000	20,348
Alilem	Amburayan		
Alimodían	Iloilo	11,837	10,197
Aling	Mindoro		486
Almeria	Leyte	3,216	2,400
Aloguinsán	Cebu	3,983	3,548
Aloran	Misamis	2,700	3,059
Aló	Zambales	894	1,114
Alubijid	Misamis	6,716	2,549
Amadeo	Cavite	3,873	3,283
Amamit	Amburayan		
Ambaycán	Bontoc		206
Amblán	Negros Oriental	5,500	4,179
Ambuclo	Benguet		
Ampusingan	do		536
Amulung	Agayán de Luzón		6,708
Ananao	Tagán		
Anao	Tarlac	7,000	2,717
Anao-aon	Surigao	602	1,103
Anda	Bohol	4,036	3,432
Do	Zambales	3,761	2,914
Angadanán	Isabela de Luzón	2,739	2,188
Angaqui	Lepinto		
Angat	Bulacán	8,050	8,152
Angeles	Pampanga	3,000	9,546
Angono	Rizal	1,955	2,128
Anilao	Iloilo	2,699	3,459
Aniniy	Antique	4,802	4,981
Anquilén	Bontoc		286
Antadão	do		329
Antequera	Bohol	5,842	5,777
Antipolo	Mórong (Rizal)	3,500	3,970
Antique	Antique (Panay)	1,236	7,604
Apalit	Pampanga	11,753	10,598
Aparri	Agayán de Luzón	11,262	7,620
Arapiles	Dávao		
Arayat	Pampanga	14,014	10,040
Arévalo	Iloilo	3,594	3,286

\* During the Spanish domination the Marianas, Carolinas, and Pelew archipelagos were dependent on the Philippine Archipelago politically.

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Argao	Cebú	34,050	23,122
Arguelles	Negros Oriental	2,390	2,391
Aringay	Unión	3,044	7,147
Aritao	Nueva Vizcaya	700	1,182
Asiingan	Pangasinán	3,522	11,654
Astorga	Dávao		173
Asturias	Cebú	6,000	6,931
Atimonan	Tayabas	10,000	9,506
Atoc	Benguet		1,418
Ayala	Zamboanga		1,740
Ayungon	Negros Oriental	1,900	693
Ayuquitan	do	1,107	2,243
Azagra	Romblón	3,171	3,434
Baao	Ambos Camarines (Sur)	3,980	7,044
Babatuñgon	Leyte	6,759	1,322
Bacáca	Albay	2,213	10,240
Bacarra	Ilocos Norte	10,547	13,949
Bagnotan	Unión	13,735	6,838
Bacó	Mindoro	6,555	610
Bacólod	Negros Occidental	440	6,842
Bacolor	Pampanga	6,268	12,920
Bacón	Sorsogón	10,642	14,097
Do	Negros Oriental	13,013	7,050
Bacoor	Cavite	8,371	11,685
Bacuag	Surigao	13,113	851
Bacuit	Palawan	569	
Bacun	Ilocos Sur	1,210	924
Badaojos	Romblón	924	2,878
Baclayón	Bohol	3,234	7,901
Badián	Cebú	8,048	7,373
Badoc	Ilocos Norte	9,409	11,617
Bagábag	Nueva Vizcaya	10,846	1,862
Bagac	Bataán	1,915	1,997
Bagamanoc	Catanduanes	1,635	
Baganga	Surigao	1,209	1,194
Bagay	Ambos Camarines (Sur)	1,114	1,703
Bagnén	Lepanto	1,180	
Bago	{ Negros Occidental { Ilocos Sur	7,092 196	8,427
Baguio	Benguet		655
Bailén	Cavite		4,531
Balninao	Bontoc		
Bais	Negros Oriental	9,304	4,971
Balábac	Balábac		1,834
Balaca	Lepanto	263	
Balagbag	Benguet		682
Balambán	Cebú	9,610	11,113
Balanga	Bataán	9,000	8,308
Balangiga	Samar	5,000	4,012
Balaoan (Baláuang)	Unión	12,242	12,104
Balasan	Iloilo		
Balayán	Batangas	14,747	16,214
Baleno	Masbate and Ticao	923	1,378
Baler	Príncipe	1,911	2,307
Balete	Cápiz	5,065	2,323
Balili	Bontoc		186
Balilijan	Bohol	1,860	5,072
Balincaguing	Zambales	2,378	2,469
Balingasag	Misamis	11,491	4,948
Baltuag	Bulacán	14,122	17,223
Balugan	Bontoc		582
Baluñgao	Nueva Ecija	3,848	3,509
Bambán	Tárlac	3,196	1,810
Bambang	Nueva Vizcaya	3,387	2,899
Banaao	Lepanto	385	
Banate	Iloilo	6,764	6,252
Banaue	Bontoc		389
Banaue	Lepanto		
Banco	do	520	
Bañá	Cápiz	9,127	7,370
Bangar	Unión	9,000	9,617
Bangued	Abra	13,417	16,413
Bangui	Ilocos Norte	6,129	7,749
Banguitan	Lepanto	450	
Bani	Zambales	4,293	3,394
Banná	Ilocos Norte	2,146	4,112
Bañolas	Dávao		
Bantay	Ilocos Sur	6,449	5,750
Bantayán	Cebú	10,016	13,898
Bantón	Romblón	3,449	3,438
Baraas	Ilocos Sur (Amburayan)	105	
Barás	Rizal (Mórong)	1,217	1,222

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Barasoaín	Bulacán	9,675	9,500
Batbarit	Ilocos Sur (Amburayan)	196	
Barbaza	Antique	3,231	8,915
Barcelona	Sorsogón	1,567	4,406
Barili	Cebu	20,914	17,769
Barótac Nuevo	Iloilo	11,805	12,775
Barótac Viejo	do	5,590	6,576
Barugo	Leyte	12,322	8,293
Basey	Samar	13,736	12,116
Basilan	Basilan	1,300	
Basud	Ambos Camarines (Norte)	1,874	1,608
Bátac	Ilocos Norte		16,981
Batán	Cápiz	12,908	10,019
Batangas	Batangas	39,358	35,431
Batañgen	Ilocos Sur	433	
Batbató	do	119	
Bató	Ambos Camarines (Sur)	4,861	4,675
	Leyte	3,651	2,612
Batuanán	Bohol	1,270	1,288
Bauan	Batangas	39,659	35,645
Báuang	Unión	7,701	7,886
Bay	Laguna La	1,796	2,354
Bayambang	Pangasinán	8,505	11,389
Bayanan	Negros Oriental		
Baybay	Leyte	17,367	11,444
Bayombong	Nueva Vizcaya	3,691	3,647
Besao	Lepanto	2,055	
Betis	Pampanga	4,460	4,207
Betuagan	Bontoc		272
Bigaá	Bulacán	8,120	7,815
Biliran	Leyte	6,201	1,667
Binalbagan	Negros Occidental	5,135	5,269
Binalonan	Pangasinán	10,295	9,126
Binañonan de Lampón	Infanta	7,557	6,025
Binañonan	Rizal (Mórong)	7,624	7,813
Binmaley	Pangasinán	13,787	15,308
Biñang	Laguna La	19,786	15,452
Bislig	Surigao	7,583	845
Boac	Mindoro	14,722	13,416
Bobón	Samar	4,380	4,011
Bocaue	Bulacán	10,345	8,600
Bocot	Benguet		716
Bogó	Cebu	16,350	15,192
Bolinang	Bontoc		389
Bolinao	Zambales	4,075	6,874
Boljoón	Cebu	7,413	5,067
Bombón	Ambos Camarines (Sur)	2,656	2,368
Bongabon	Mindoro	271	568
	Nueva Ecija	3,848	2,506
Bonãao	Sulu (Joló)		
Bontoc	Bontoc		987
Borbón	Cebu	2,805	3,430
Boronãan	Samar	9,448	9,769
Bosoboso	Rizal (Mórong)	855	667
Botolan	Zambales	4,566	3,730
Bucay	Abra	2,461	5,132
Buena Vista	Iloilo	3,497	5,972
Bugasón	Antique	14,104	3,455
Buguey	Cagayán de Luzón	1,120	1,202
Buguias	Benguet		1,113
Buhi	Ambos Camarines (Sur)	10,000	7,202
Bula	do	2,800	2,958
Bulacán	Bulacán	13,386	11,891
Bulalacao	Mindoro	516	583
Bulan	Sorsogón	11,000	7,936
Bulusan	do		4,666
Bumanan	Surigao		585
Burauen	Leyte	21,290	13,934
Buruanãa	Cápiz	3,967	4,284
Bustos	Bulacán	7,025	6,797
Butúan	Surigao	10,543	4,128
	Butúan	2,000	
Cabá	Unión	4,164	2,905
Cabagán Nuevo	Isabela de Luzón	6,240	5,843
Cabagán Viejo	do	3,633	3,496
Cabalian	Leyte	4,785	4,121
Cabanatúan	Nueva Ecija	12,000	9,607
Cabancalan	Negros Occidental	7,636	5,780
Cabañãan	Zambales	2,798	2,807
Cabatúan	Iloilo	18,177	20,284
Cabayan	Benguet	844	1,236
Cabiao	Nueva Ecija	7,924	7,937
Cabinti or Cavinti	Laguna	5,515	5,704



*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Cabugao	Ilocos Sur	8,259	11,982
Cabúntug	Surigao	4,175	1,968
Cabúyao	Laguna	8,888	9,029
Cádiz Nuevo	Negros Occidental	7,046	3,554
Cagayán	Misamis	9,405	6,626
Cagayancillo	Antique	3,000	
Cagsaua	Albay	20,449	20,298
Caibiran	Leyte	4,153	
Caintá	Rizal (Mórong)	2,275	2,388
Cajaguaán	Leyte	260	1,134
Cajidiocan	Romblón	3,636	3,233
Calabanga	Ambos Camarines (Sur)	5,704	5,497
Calacá	Batangas	8,288	12,263
Calamba	Laguna	11,476	8,808
Calapán	Mindoro	5,585	4,103
Calape	Bohol	10,025	8,155
Calasgasan	Ambos Camarines	813	
Calasiao	Pangasinán	13,753	15,369
Calatagán	Batangas	964	2,003
Calatrava	Dávao		
Calatrava	Negros Occidental	12,720	12,161
Calaoag	Tayabas	2,813	1,734
Caláuang	Laguna	3,107	3,760
Calbáyog	Sámar	30,250	20,484
Calbiga	do	4,292	3,148
Calibo or Calivo	Cápiz	10,865	12,028
Calinog	Iloilo	8,866	7,754
Calolbong	Albay	4,382	3,608
Caloocan	Rizal (Manila)	9,843	8,859
Calumpit	Bulacán	15,072	11,613
Caluya	Mindoro	509	539
Camalaniugan	Cagayán de Luzón	4,198	4,194
Camálig	Albay	14,868	14,437
Camaligan	Ambos Camarines (Sur)	5,049	3,465
Camiling	Tárlac	23,410	17,115
Canaman	Ambos Camarines (Sur)	5,959	5,422
Cangcô	Bontoc		215
Candaba	Pampanga	14,585	11,542
Candelaria	Tayabas	3,234	3,366
Candelaria	Zambales	2,865	2,582
Candijay	Bohol	7,872	3,834
Candón	Ilocos Sur	15,797	17,971
Canoan	Bohol	9,380	8,828
Cantilan	Surigao	10,026	6,045
Capalonga	Ambos Camarines (Norte)	1,692	1,134
Capaňgan	Benguet	853	1,094
Capas	Tárlac	2,925	1,888
Cápiz	Cápiz	13,676	16,692
Capoocan	Leyte		1,345
Capul	Sámar	2,295	3,379
Caraga	Surigao	8,690	2,843
Caramoran	Ambos Camarines (Sur)	6,697	
Caramoran	Albay	908	894
Carranglán	Nueva Ecija	937	1,558
Cárcar	Cebú	30,300	26,039
Cardona	Rizal (Mórong)	2,641	2,644
Caridad	Cavite		5,971
Carig	Isabela de Luzón	2,477	1,387
Carigara	Leyte	13,732	12,680
Caritan	Antique	1,240	9,158
Carlés	Iloilo	10,300	10,234
Carlota (La)	Negros Occidental		6,386
Carmen	Bohol	3,300	3,170
Do	Cebú	6,673	6,638
Carmona	Cavite	3,959	3,883
Carmona	Dávao		
Carrascal	Surigao		1,929
Casignán	Príncipe		181
Casiguran	Sorsogón	8,662	5,528
	Príncipe	1,527	1,848
	Sorsogón	2,353	2,308
Castilla	Zambales	3,357	3,736
Castillejos	Masbate and Ticao		1,561
Cataingan	Tayabas	4,000	3,816
Catanauan	Albay		1,300
Catanduanes Bagamanoc	do		6,732
Catanduanes Bató	Misamis	4,874	4,099
Catarman	Sámar	10,482	6,757
	do	6,459	6,610
Catbalogan	Surigao	3,500	1,663
Catel	Bohol	2,141	2,005
Catigbían	Cebú	6,098	5,429
Catmón	Sámar	9,565	9,301
Catúbig			

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population estimated, 1898-99.	Population, census of 1887.
Cauayan	Ilocos Sur	6,050	5,344
Cauayan	Isabela de Luzón	2,115	2,159
Cauayan	Negros Occidental	4,644	2,194
Cavite	Cavite	1,497	2,392
Cavite Viejo	Cavite	9,484	6,302
Caibiran	Leyte		4,445
Cebú	Cebú	35,243	11,198
Cervantes	Lepanto		16,026
Cervera	Dávao		
Claveria	Cagayán de Luzón	4,641	3,654
Coloma de Santa Isabela	Isabela de Luzón		1,602
Compostela	Cebú	4,393	4,431
Concepción	Iloilo	5,736	3,872
	Tarlac	13,499	13,423
	Tiagán	353	
Consolación	Cebú	4,616	4,307
Corcuera	Romblón	1,995	1,990
Córdoba	Cebú	5,009	6,329
	Iloilo	2,744	3,218
Cordón	Isabelo de Luzón		976
Core la	Bohol	4,215	3,735
Cortés	do	6,018	
	Surigao	1,801	
Cotabato (Cottabato)	Cotabato	3,000	893
Cristiano	Bontoc		156
Cristina	Dávao		
Cuartero	Cápiz	5,175	4,623
Cuenca	Batangas	6,735	5,644
Culasi	Antique	10,553	7,549
Culión	Calamianes	3,500	4,277
Cunugun	Bontoc		339
Cuyapó	Nueva Ecija	9,350	8,702
Cuyo	Calamianes	8,258	3,903
Daan Bantayán	Cebú	8,530	9,621
Daclán	Benguet	967	994
Dáet	Ambos Camarines (Norte)	10,650	7,993
Dagami	Leyte	25,000	23,748
Dagupan	Pangasinán	16,000	16,800
Dalaguete	Cebú	21,323	19,269
Dalican	Bontoc		443
Danao	Cebú	15,483	13,575
Dancalan	Negros Occidental	1,445	2,984
Dauin	Negros Oriental		6,751
Daulig	Palawan (Paragna)		569
Dao	Antique	7,948	7,549
	Cápiz	8,787	5,277
Dapá	Surigao, Mindanao	1,900	2,281
Dapitan	Misamis	3,955	3,788
Dapnán	Surigao	500	275
Dasol	Zambales		2,425
Dauis	Bohol	8,992	7,248
Dávao	Mindanao	3,308	1,473
Despujol	Romblón		
Diadi	Nueva Vizcaya	109	105
Dimaio	Bohol	8,014	7,901
Dinagat	Surigao, Mindanao	5,264	2,343
Dinalupijan	Bataan	738	3,784
Dingle	Iloilo	11,000	12,800
Dingrás	Ilocos Norte	12,600	11,669
Dipólog	Misamis	4,611	3,355
Dolores	Abra	2,970	2,062
Do	Tayabas	2,571	2,103
Donsol	Sorsogón	5,500	5,621
Ducñas	Iloilo	7,130	6,339
Duero	Bohol	7,143	5,727
Dulag	Leyte	10,113	9,093
Dumaguete	Negros Oriental	13,613	15,244
Dumálag	Cápiz	8,000	7,390
Dumangas	Iloilo	14,114	16,736
Dumanjug	Cebú	13,171	9,728
Dumarán	Palawan (Paragua)		2,032
Dumárao	Cápiz	5,085	5,150
Dúpax	Nueva Vizcaya	2,229	3,806
Echagüe	Isabela de Luzón	5,790	3,986
Egaña	Antique	1,995	2,366
El Pardo	Cebú	10,647	
El Salvador	Misamis	2,845	
Enrile	Cagayan, Luzón	7,000	5,203
Escalante	Negros Occidental	3,000	3,892
Estancia	Iloilo		
Fidilizan	Bontoc	478	246
Floridablanca	Pampanga	7,654	6,654

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Gainza	Ambos Camarines	2,631	2,900
Galiano	Benguet	1,330	870
Gamd	Isabela de Luzón	6,101	4,022
Gándara	Samar	15,563	9,028
Gapán	Nueva Ecija	20,216	20,286
García Hernández	Bohol	5,064	5,768
Garellano	Davao		
Gasán	Marinduque	4,785	5,436
Gattaran	Cagayán, Luzón	805	1,211
Gerona	Tarlac	9,261	7,800
Getafe	Bohol	3,397	
Gigáquit	Surigao	7,116	5,553
Ginatilan	Cebu	12,144	9,404
Ginatúan	Surigao	2,277	2,494
Gingóog	Misamis	1,433	2,560
Ginigaran	Negros Occidental	13,620	8,969
Goa	Ambos Camarines	7,748	5,574
Granada	Negros Occidental	2,864	1,460
Guagua	Pampanga	10,722	10,074
Gulbat	Sorsogón	13,359	12,125
Guernica	Davao		
Guibunán	Benguet	685	685
Guiguintó	Bulacán	5,115	5,134
Guihulugan or Guijulugan	Negros Oriental	7,006	1,154
Guiljugan	Negros Occidental		2,375
Guimbal	Iloilo		11,562
Guimbalaón	Negros Occidental		
Guinaon	Bontoc		679
Guinayanán	Tayabas	2,000	2,215
Guindulmán	Bohol	8,063	
Guinobatan	Albay	20,500	19,842
Guinsilitan	Misamis	1,875	1,699
Guistjan	Antique	6,247	3,845
Guiuan	Samar	11,311	10,583
Gumacá	Tayabas	7,571	7,504
Gunduhúan	Bohol		6,737
Gusá	Misamis	790	704
Hagonoy	Bulacán	20,120	18,500
Hermosa or Llana Hermosa	Bataán	2,649	3,591
Hernani	Samar	2,555	3,140
Hilongos	Leyte	13,813	13,675
Hindang	do	5,314	4,415
Hinunangan (Hinanañgan)	do	7,899	6,752
Hinundayan	do	3,896	3,562
Iba	Zambales	3,512	3,414
Ibaán	Batangas	8,900	9,017
Ibájay	Cápiz	11,351	12,162
Ibung	Nueva Vizcaya	980	514
Igbarás	Iloilo	12,140	9,952
Iguig	Cagayán	4,000	4,509
Ilagan	Isabela de Luzón	13,811	11,275
Ilaya	Lanao	1,099	
Iligan	Misamis	6,020	3,087
Iling	Mindoro	427	486
Ilog	Negros Occidental	6,070	4,557
Iloilo	Iloilo	6,429	11,364
Imus	Cavite	14,676	12,142
Inabañga	Bohol	9,957	10,344
Inapuy	Bontoc	417	134
Indán	Ambos Camarines	5,800	6,194
Indang	Cavite	1,500	10,848
Infanta	Zambales	3,445	3,051
Initao	Misamis		1,252
Inopacan	Leyte	4,239	2,792
Ipil	Bohol	1,745	1,183
Iponan	Misamis	5,586	4,746
Iriga	Ambos Camarines	17,094	15,229
Iriron	Mindoro	143	191
Irosin	Sorsogón	5,224	4,198
Isabela	Basilan	1,300	985
	Negros Occidental	11,104	9,218
Isio	do	1,596	2,487
Itogon	Benguet	609	249
Iv-san	Cápiz	5,000	5,000
Jabounga	Surigao	1,644	1,661
Jaén	Nueva Ecija	4,651	6,415
Jagná	Bohol	11,162	12,267
Jagnaya	Cápiz	2,500	2,095
Jalajala	Rizal (Mórong)	1,735	1,728
Jamindán	Cápiz	5,000	881
Janitay	Iloilo	28,738	25,743

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Jaro	Leyte	12,475	9,228
Jasaán	Iloilo	10,333	10,993
Jiabong	Misamis	9,444	3,611
Jimalalud	Samar	3,579	2,075
Jimamaylan	Negros Oriental	5,559	7,073
Jiménez	Negros Occidental	6,758	3,057
Jimeno	Misamis	8,707	5,990
Joló (Sulu)	Cápiz	3,278	2,940
Jovellar	Sulu	1,500	832
Juban	Albay	5,279	3,563
La Caridad	Sorsogon	6,000	3,841
La Carlota	Cavite	1,258	5,971
La Grana	Negros Occidental	12,384	6,836
La Paz	Samar	3,413	3,247
Do	Abra	2,869	3,511
Do	Iloilo	3,641	3,872
La Trinidad	Tarlac	2,805	4,118
Labo	Benguet	2,000	1,589
Lacy	Ambos Camarines	4,213	4,120
Lagabay	Negros Oriental	6,448	
Lagaul	Dávao		613
Lagonlong	Quilangán		
Lagonoy	Misamis	1,834	1,618
Lagundi	Ambos Camarines	8,500	10,340
Lal-ló	Rizal (Mórong)		
Lambunao	Cagayán	6,475	4,294
Lanang	Iloilo	7,989	7,727
Laarigan	Samar	4,779	3,034
Lanuza	Misamis	11,779	5,661
Laoag	Surigao		2,207
Laoang	Ilocos Norte	37,094	30,840
Lapog	Samar	8,129	7,315
Las Mercedes	Ilocos Sur	6,000	6,826
	Dávao		
Las Piñas	Zamboanga	2,372	3,454
Lauis	Rizal (Manila)	4,000	3,958
Lavezares	Bohol		7,188
Leganés	Samar	3,480	3,347
Legaspi	Iloilo	2,875	4,553
Lemery	Albay	6,017	7,182
Do	Batangas	2,890	15,386
León	Iloilo	3,677	2,493
Leyte	do	13,950	13,059
Lezo	Leyte	6,719	3,211
Lián	Cápiz	5,500	3,793
Liaña	Batangas	5,889	4,877
Libacao	Surigao	6,340	2,387
Libanan	Cápiz	3,914	3,783
Libog	Ambos Camarines	14,512	14,655
Libong	Albay	6,569	7,116
Licab	do	4,125	4,563
Ligao	Nueva Ecija	5,222	
Lila	Albay	17,371	16,980
Lilio	Bohol	4,470	4,255
Liloan	Laguna	5,000	5,975
Do	Cebú	8,380	8,041
Lingayén	Leyte	3,982	2,986
Linguig	Pangasinán	18,886	15,755
Lipa	Surigao	6,340	
Liana Hermosa	Batangas	40,733	43,077
Laoy	Bataán	2,649	3,591
Loboc	Bohol	7,169	6,353
Loboó	do	10,174	10,756
Loctugan	Batangas	6,472	5,125
Loculan	Cápiz	3,475	2,920
Longos	Misamis	2,110	4,373
Loó	Laguna	1,413	1,426
Looc	Benguet	916	1,015
	Mindoro	1,204	1,309
Loón	Romblon	4,500	5,963
López	Bohol	15,365	12,321
Loreto	Tayabas	6,412	7,647
Las Baños	Surigao		
Lubang	Laguna	2,756	2,753
Lubao	Mindoro	6,541	3,716
Lubunigan	Pampanga	21,175	20,344
Luebán	Lanao	5,157	2,565
Lucena	Tayabas	12,755	10,23
	Iloilo	6,511	5,403
	Tayabas	7,000	5,497
Luisiana	Laguna	3,802	4,609

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Lumbang	Laguna	4,293	4,951
Lupao	Nueva Ecija	608	
Lupi	Ambos Camarines	765	790
Luzón	Dávao		233
Maasin	Leyte	18,499	14,473
Maayon	Iloilo	9,674	10,476
Mabalacat	Cápiz	1,616	1,980
Mabatang	Pampanga	10,600	9,101
Mabatobató	Bataán	1,766	1,857
Mabitac	Ambos Camarines	849	1,196
Macabebe	Laguna	1,431	1,398
Macalelón	Pampanga	10,400	12,845
Macató	Tayabas	3,000	3,426
Mac-Crohon	Cápiz	10,136	6,589
Madalag	Leyte	5,780	4,985
Madridejos	Cápiz	2,684	3,811
Magálang	Cebu		
Magallanes	Pampanga	8,262	8,799
	Romblón	1,055	1,573
	Sorsogón	2,377	2,588
	Cavite	1,200	2,477
Magárao	Ambos Camarines	5,744	5,663
Magdalena	do	2,352	
	Laguna		3,143
Magsingal	Masbate, Ticao	971	846
Magúlang	Ilocos Sur	8,446	4,817
Mahinog (Magainog)	Quiañán		
Maínit	Misamis	4,687	4,173
Majayjay	Bontoc	417	349
Malabúyoc	Laguna	6,528	7,176
Malasiqui	Cebu	13,113	6,947
Maláueg	Pangasinán	8,900	12,755
Malecón	Cagayán	3,819	2,947
Malibago	Bontoc		561
Malibay	Leyte	1,119	815
Malilipot	Rizal	2,890	1,833
Malinao	Albay	5,995	5,243
	do	10,296	11,828
Malitbog	Cápiz	5,571	6,586
Malolos	Leyte	7,906	7,466
Mambajao	Bulacán	14,599	15,706
Mambúlao	Misamis	18,000	8,737
Mambúrao	Ambos Camarines	1,182	939
Mambúso	Mindoro	499	408
Manáoaag	Cápiz	11,000	8,525
Manapla	Pangasinán	17,500	9,331
Mandaue	Negros Occidental		4,309
Mandurriao	Cebu	15,307	10,118
Mangaldán	Iloilo	6,749	5,259
Mangarín	Pangasinán	16,143	12,790
Mangatarén	Mindoro	2,289	357
Manguirín	Pangasinán	10,146	10,744
Manila	Ambos Camarines	1,300	697
Manitao	Manila	350,000	169,192
Manjúyod	Albay	1,515	1,588
Mansalay	Negros Oriental	7,486	4,547
Maragondón	Mindoro	379	353
Maria	Cavite	8,313	8,277
Do	Negros Oriental	5,415	
Maria Cristina	Bohol		4,976
Maribojoc	Misamis	140	138
Marilao	Bohol	10,852	10,286
Maripipi	Bulacán	5,075	4,566
Mariquina	Leyte	1,998	1,529
Mariveles	Rizal	10,313	9,491
Masbate	Bataán	1,429	1,690
Masinloc	Masbate	2,345	2,284
Matalom	Zambales	2,945	2,711
Matina	Leyte	6,146	4,671
Matnog	Dávao		
Mati	Sorsogón	3,745	3,665
Maubán	Davao	600	535
Maynit	Tayabas	9,268	8,982
Medellín	Surigao	4,550	2,006
Méndez Muñoz	Cebu	8,221	4,961
Mercedes	Cavite	3,745	3,651
Mérída	Samar	3,068	1,432
México	Leyte	897	1,712
Meycauayan	Pampanga	17,099	14,721
Miagao	Bulacán	8,119	9,256
	Iloilo	22,100	20,732

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Milagros	Masbate	1,789	2,985
Milaor	Ambos Camarines	5,120	5,053
Mina	Iloilo	4,357	5,720
Minalabac	Ambos Camarines	3,869	3,621
Minalin	Pampanga	6,386	6,239
Minglanilla	Cebu	6,310	17,904
Minuluan	Negros Occidental	11,338	7,561
Misamis	Misamis	6,075	3,944
Moalboal	Cebu	9,509	5,929
Mobo	Masbate	1,896	1,783
Mogpog	Marinduque	5,214	5,173
Molo	Iloilo	9,547	7,281
Molugan	Misamis	1,044	1,170
Moncada	Tarlac	7,601	2,425
Mondragón	Samar	1,556	1,222
Montalban	Rizal	3,055	3,352
Morella	Davao		
Moriones	Tarlac	1,289	1,080
Morón	Bataan	2,622	2,653
Mórong	Mórong (Rizal)	9,430	6,648
Mulanay	Tayabas	325	1,495
Munguia	Bontoc		
Muntinlupa	Rizal	5,068	4,212
Murcia	Negros Occidental	8,000	2,768
Do	Tarlac		2,316
Naanán	Misamis	890	1,200
Nabua	Ambos Camarines	17,789	17,244
Naga or Nueva Cáceres	do	11,550	9,251
Naga	Cebu	10,926	10,525
Nagaba	Iloilo	8,000	5,794
Nagcarlán	Laguna	12,976	13,586
Nagpartian	Ilocos Norte	1,985	3,477
Naguilian	Isabela de Luzón	2,172	
Do	Unión	10,405	9,458
Náig	Cavite	9,215	8,078
Nalupa	Antique	2,972	2,861
Namacpacán	Unión	8,630	8,849
Nampicúan	Nueva Ecija	3,241	2,046
Narvacán	Ilocos Sur	16,500	18,393
Nagsiping	Cagayán	1,023	964
Nasugbú	Batangas		7,838
Nauján	Mindoro	8,312	4,367
Naval	Leyte	3,183	2,835
Navas	Cápiz	5,257	4,214
Navotas	Rizal		12,844
Nonoc	Surigao	541	667
Norzagaray	Bulacán	5,305	6,111
Novaliches	Rizal	1,871	2,166
Noveleta	Cavite	2,804	2,214
Nueva Cáceres	Ambos Camarines	3,339	5,104
Nueva Coveta	Ilocos Sur	789	435
Nueva Valencia	Negros Oriental	6,316	5,576
Numancia	Cápiz	6,123	6,111
Do	Surigao	4,111	2,678
Oás	Albay	10,357	10,949
Obando	Bulacán	7,948	7,576
Odiongan	Romblón	5,924	6,378
O'Donell	Tarlac		1,693
Olongapó	Zambales		
Opol	Misamis		
Opón	Cebu	11,506	10,267
Oquendo	Samar	5,200	3,098
Orán	Davao		
Orani	Bataan	6,400	5,949
Orás	Samar	5,667	5,071
Orión	Bataan	10,373	7,429
Ormoc	Leyte	8,107	13,315
Oroquieta	Misamis	9,000	7,374
Oslob	Cebu	6,013	5,664
Oteiza (Oteyza)	Surigao		1,541
Otón	Iloilo	13,363	14,567
Oyanguren	Davao		
Pacte	Laguna	2,887	2,929
Pagbilao	Tayabas	5,756	4,524
Pagsanján	Laguna	6,327	7,124
Palanan	Isabela de Luzón	1,137	980
Palanas	Masbate	2,749	2,133
Palánog	do		
Palápog	Samar	5,802	3,468
Paláwig	Zambales	2,584	2,521
Palma	Benguet	704	892

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99	Population, census of 1887.
Palo	Leyte	17,736	16,055
Palompón	do	7,858	5,765
Paltóc	Tingán	770	
Paltán	Mindoro	1,561	1,677
Pambujan	Samar	7,423	5,396
Paminuitan	Bohol		5,199
Pamplona	Ambos Camarines	3,647	3,253
	Agayán	2,404	4,929
Panay	Cápiz	15,484	19,343
Pandacan	Manila City	2,446	24,624
Pandán	Antique	13,737	10,654
	Catanduanes (Albay)	2,153	1,884
Pañgil	Laguna	2,459	2,794
Panglao	Bohol	6,795	4,272
Paniqui	Tarlac	8,712	5,553
Panitan	Cápiz	10,020	6,455
Pantabañgán	Nueva Ecija	1,513	1,186
Páoay	Ilocos Norte	11,848	12,147
Paombong	Bulacan	10,297	8,177
Páquil	Laguna	1,719	1,826
Paracale	Ambos Camarines	3,211	2,762
Parañaque	Rizal	9,863	10,173
Paranas	Samar	7,366	5,879
Páric or Dolores	do	3,469	2,592
Pasacao	Ambos Camarines	1,548	1,413
Pásig	Rizal	22,000	18,549
Passi	Iloilo	13,802	8,629
Pastrana	Leyte		
Pasuquin	Ilocos Norte	5,616	7,262
Patnongon	Antique	5,911	6,239
Pateros	Rizal	2,842	5,762
Pavía	Iloilo	10,221	7,924
Payo	Catanduanes	2,800	1,737
Peñaranda	Nueva Ecija	7,700	6,926
Peña plata	Dávao		
Pérez Dasmariñas	Cavite	4,696	4,339
Piat	Agayán	2,716	2,591
Pidigan	Abra	2,142	2,873
Piddig	Ilocos Norte	10,841	7,828
Pila	Laguna	5,987	6,101
Pilar	Abra	4,107	1,564
Do	Bataan	3,471	3,749
Do	Cápiz	2,895	4,833
Do	Cebu	4,268	4,231
Do	Sorsogón, Albay	5,458	4,550
Pili	Ambos Camarines	3,635	3,087
Pililla	Mórong (Rizal)	2,000	4,000
Pinabagdao	Samar	1,975	1,114
Pinamalayan	Mindoro	1,292	559
Pinamungajan	Cebu	5,378	4,443
Pineda, now Pásay	Rizal (Manila)	9,825	7,784
Piquigan	Bontoc		293
Pitogo	Tayabas	3,011	2,613
Placer	Surigao		893
Polá	Mindoro	572	939
Polangui	Albay	10,050	9,106
Polillo	Infanta	1,400	1,114
Polo	Bulacán	7,945	10,162
Polloc	Cotabato	400	390
Pontevedra	Cápiz	9,512	6,491
Do	Negros Occidental	12,000	6,901
Poquitan	Bontoc		439
Pórac	Pampanga	8,512	8,594
Poró	Cebu	7,000	6,932
Pototan	Iloilo	14,512	20,912
Pozorrubio	Pangasinán	9,947	9,604
Puerto Galera	Mindoro	1,912	792
Puerto Princesa	Palawan (Paragua)	1,589	1,345
Pulilan	Bulacán	10,058	9,869
Puncán	Nueva Ecija	501	562
Pura	Tarlac	5,255	4,301
Quinablanñgán	Mati	299	
Quinapundan	Samar	2,000	1,703
Quináquil or Quing-áquing	Bontoc	512	290
Quinuguitan	Misamis	1,320	1,415
Quingná	Bulacan	8,854	7,312
Quiot	Leyte	2,422	2,025
Quipayo	Ambos Camarines	1,793	1,915
Ragay	do	2,300	1,703
Reina Mercedes	Isabela de Luzón	3,286	1,807
Romblón	Romblón	6,764	6,016

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Roquetas	Dávao		
Rosales	Nueva Ecija	11,519	7,168
Rosario	Batangas	12,435	14,376
Do	Cavite	6,385	5,076
Do	Unión	2,246	2,834
Ronda	Cebu	4,394	4,339
Sablayan	Ilocos Sur	851	864
Sablán	Benguet		543
Sacasacan	Bontoc		25
Sadanga	do		568
Sagay	Misamis	5,066	3,154
Sagnay	Ambos Camarines	3,985	
Salasa	Pangasinán	7,067	5,845
Salay	Misamis	1,816	1,635
Salcedo	Ilocos Sur	914	1,802
	Samar	4,470	3,467
Sagada	Bontoc		1,090
Salvador	Misamis		3,293
Sámal	Bataan	5,233	4,938
Samboan	Cebu	10,422	7,052
Sanuqui	Bontoc	546	532
San Agustín	Masbate	1,129	1,451
San Antonio	Laguna	1,649	1,673
	Nueva Ecija	7,269	8,327
	Zambales	4,988	4,853
San Bartolomé	Batanes	1,722	1,355
San Carlos	Pangasinán	23,934	30,148
San Carlos de Marigatao	Batanes	1,229	1,236
San Clemente	Tarlac	1,875	1,954
San Dionisio	Iloilo	1,782	4,375
San Emilio	Tiagán	109	
San Enrique	Iloilo	3,015	3,084
	Negros Occidental	3,607	3,410
San Esteban	Ilocos Sur	2,132	2,821
San Fabián	Pangasinán	9,018	9,411
San Felipe	Zambales	4,265	4,218
San Felipe Nery	Rizal	5,465	7,517
San Fernando	Ambos Camarines	3,271	3,068
	Cebu	12,155	12,967
	Masbate	2,367	2,620
	Pampanga	13,266	16,031
	Unión	12,892	12,185
San Fernando (Rivera de)	Zambales		453
San Francisco	Cavite	9,055	8,396
	Cebu	6,567	6,486
San Gregorio	Abra	1,429	1,231
San Ildefonso	Bulacán	6,601	7,262
	Ilocos Sur	2,033	2,584
San Isidro del Campo	Leyte	3,352	3,145
San Isidro	Nueva Ecija	7,056	9,474
	Pangasinán	2,531	4,340
	Zambales	2,863	2,623
San Jacinto	Masbate	2,459	2,469
	Pangasinán	5,059	4,862
San Joaquín	Iloilo	13,918	12,516
San José	Ambos Camarines	9,000	7,903
	Batangas	10,000	9,874
	Bulacán	2,397	2,760
	Corregidor	514	458
	Dávao		
	Nueva Ecija	852	
San José de Buenavista	Antique	5,621	6,634
San José de Casignán	Príncipe	267	
San José de Ibaña	Batanes	1,951	2,237
San José de Manabo	Abra	1,285	818
San José de Navotas	Manila (Rizal)	9,154	
San Juan	Abra	1,146	714
	Batangas	14,017	11,168
	Bohol		5,428
San Juan (de Guimba)	Nueva Ecija	2,994	5,971
San Juan (de Macapilay)	Negros Oriental	5,979	
	Surigao		341
	Unión	10,211	9,716
San Juan del Monte	Manila (Rizal)	2,011	2,288
San Julián	Samar	3,616	2,955
San Leonardo	Nueva Ecija		
San Luis	Batangas	5,201	5,899
	Pampanga	10,298	10,765
San Manuel	Pangasinán	6,867	10,164
San Marcelino	Zambales	4,043	4,275
San Mateo	Rizal	6,700	4,641



*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblo.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
San Miguel or Sarrat	Ilocos Norte	9,015	11,251
	Iloilo	7,300	6,830
	Leyte	4,126	2,648
	Pampanga	1,887	5,585
San Miguel de Mayumo	Bulacán	20,460	19,397
San Nicolás	Ilocos Norte	9,578	13,056
	Cebú	17,800	21,586
	Pangasinán	10,204	12,743
San Narciso	Tayabas	1,087	2,178
	Zambales	7,255	7,282
San Pablo	Laguna	19,537	19,365
San Pascual	Burías	1,601	1,690
San Pedro	Antique	7,366	6,830
San Pedro Macati	Rizal	3,921	3,625
San Pedro Tunasán	Laguna	3,700	4,404
San Quintín	Abra	725	968
	Nueva Ecija	6,852	7,578
San Rafael	Bulacán	8,469	10,149
San Ramón	Dávao		
San Remigio	Antique	2,508	3,505
	Cebú	6,192	6,681
San Ricardo	Leyte		3,077
San Roque	Cavite	3,182	5,067
San Sebastián	Cebú		2,442
	Samar	839	1,900
San Simón	Pampanga	7,817	7,088
Sanchez Mira	Cagayán	2,998	
Santa	Ilocos Sur	8,532	8,700
Santander	Cebú	4,686	3,820
Santa Ana	Manila City	2,194	2,961
Santiago	Ilocos Sur	4,087	4,123
Santa Ana	Misamis	881	2,242
	Pampanga	6,132	6,322
Santa Bárbara	Iloilo	13,000	15,167
	Pangasinán	9,667	
Santa Catalina	Ilocos Sur	5,100	5,167
Santa Cruz	Dávao		714
	Laguna	13,141	12,910
	Ilocos Sur	5,876	7,656
	Zambales	4,594	5,185
Santa Cruz de Malabón	Cavite	8,546	7,453
Santa Cruz de Mindoro	Mindoro	300	199
Santa Cruz de Napo	do	15,797	15,568
Santa Fe	Cebú	3,102	2,936
	Romblón	1,751	
Santa Ignacia	Tarlac	1,374	1,447
Santa Isabel	Bulacán	8,125	6,520
Santa Lucia	Ilocos Sur	7,113	7,566
Santa Maria	Ilocos Sur	10,030	12,622
	Isabela de Luzón	2,607	2,842
	Pangasinán	3,939	4,944
	Zamboanga	2,200	2,681
Santa Maria de Caboan	Laguna	840	855
Santa Maria de Mayán	Batanes	1,855	715
Santa Maria de Pandí	Bulacán	10,508	9,476
Santa Margarita	Samar		
Santa Rita	Pampanga	7,359	8,389
	Samar	4,394	2,337
Santa Rosa	Laguna	9,434	9,355
	Nueva Ecija	4,324	3,723
Santo Domingo	Ilocos Sur	8,931	8,114
	Nueva Ecija		
Santo Domingo de Basco	Batanes	2,981	3,269
Santo Niño	Cagayán	2,891	3,303
	Samar	4,918	
Santor	Nueva Ecija	2,921	3,099
Santo Tomás	Batangas	10,769	11,039
	Pampanga	4,321	3,781
	Unión	6,481	4,863
San Vicente	Ambos Camarines	1,325	869
	Ilocos Sur	5,237	5,469
San Vicente de Saptang	Batanes	1,753	1,791
Sapao	Quirangán		
	Surigao	1,300	1,548
Sapián	Cápiz	4,863	3,181
Sara	Concepción	10,950	6,451
Saravia	Negros Occidental	15,304	9,556
Sarlaya	Tayabas	6,966	7,112
Sebaste	Antique	3,676	4,391
Semerara	Mindoro	189	271

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Sevilla	Bohol	5,920	5,337
Sexmoán	Ilocos Sur	1,133	1,495
Siasi	Pampanga	7,969	6,289
Siaton	Sulu		146
Sibay	Negros Oriental	8,142	8,210
Sibonga	Mindoro	252	399
Sibalón	Cebú	23,455	22,979
Sibebu	Antique	11,675	12,285
Sibulan	Tiagán		
Sierra Bullones	Negros Oriental	6,346	5,857
Sigáboy	Bohol	2,119	1,460
Sigma	Malabang	900	
Silang	Antique	1,660	4,960
Silay	Cavite	7,411	7,224
Sináit	Negros Occidental	14,537	
Sinilóan	Ilocos Sur	6,936	7,503
Sipócot	Laguna	5,659	5,288
Siquijor	Ambos Camarines	1,066	1,069
Siquijor	Bohol		9,211
Siruma	Negros Oriental	11,788	7,654
Sógod	Ambos Camarines	679	533
Sógod	Cebú	6,719	5,873
Solana	Leyte	4,722	4,484
Solano	Cagayán	5,578	6,087
Solsóna	Nueva Vizcaya	4,190	5,285
Sorsogón	Ilocos Norte	3,991	4,150
Sual	Sorsogón	10,720	10,313
Suay	Pangasinán	2,636	3,961
Sabaang	Negros Occidental	2,972	1,598
Sibic	Mindoro	397	403
Silat	Zambales	3,016	2,791
Sinag	Samar	4,615	4,644
Surigao	Negros Occidental	4,332	4,425
Taal	Surigao	6,285	4,952
Tabaco	Batangas	33,378	22,039
Tabogón	Albay	17,436	16,655
Tabontabón	Cebú	8,631	7,773
Taccón	Leyte		
Tacloban	Bontoc	645	341
Taganaán	Leyte	5,226	4,899
Tagbilaran	Surigao	1,562	2,026
Tago	Bohol	8,638	7,628
Tagoloan	Surigao	1,909	2,416
Tagudin	Misamis	3,378	5,791
Taguig	Ilocos Sur	4,055	3,797
Talacogon	Rizal	9,662	9,978
Talambán	Bután		1,568
Talavera	Surigao	11,585	
Talindac	Cebú	6,226	7,218
Talibón (Talibong)	Nueva Ecija	2,720	6,439
Talisay	Palawan		663
Talisayan	Bohol	7,321	4,011
Talubing	Ambos Camarines	3,567	3,419
Tambóbong	Batangas	8,111	6,805
Tamontaca	Cebú	19,000	16,089
Tanauan	Misamis	1,684	2,392
Tanay	Bontoc		611
Tandag	Rizal	25,000	21,762
Tangalan	Surigao	5,210	2,443
Tanjay	Cápiz	2,982	3,137
Tanolo	Negros Oriental	12,408	10,300
Tapás	Bontoc	492	251
Tarangúnan	Cápiz	2,892	2,486
Tarifa	Samar	3,950	4,326
Tárlac	Dávao		
Tayabas	Tárlac	9,668	8,105
Tayasan	Tayabas	15,000	16,058
Taysán	Negros Oriental	1,569	1,381
Taytay	Batangas	6,971	7,204
Tayug	Rizal	6,800	7,472
Tayum (Tayúm)	Palawan	2,331	934
Teresa	Pangasinán	19,612	9,804
Ternate	Abra	3,436	3,201
Tetapan	Rizal	4,250	1,893
Tetuán	Cavite	1,828	2,371
	Bontoc	1,340	1,037
	Zamboanga	5,643	3,920

*Pueblos (towns) in the Philippine Islands—Continued.*

Pueblos.	Island, province, or district.	Population, estimated, 1898-99.	Population, census of 1887.
Tiagán	Abra		7,783
Tiaong	Tayabas	6,950	6,858
Tibiao	Antique	5,402	6,201
Ticlin	Mindoro	384	275
Tigao	Surigao	1,909	
Tigaon	Ambos Camarines	4,100	3,079
Tigbauan	Iloilo	9,109	9,904
Tinamana	Surigao		
Tinambac	Ambos Camarines	2,497	2,615
Titui, or Tivi	Albay	10,215	10,163
Toledo	Cebu	10,922	8,520
Tolón	Negros Oriental	1,514	2,889
Tolosa	Leyte	5,587	4,885
Torrijos	Surigao		
Trinidad	Marinduque	3,119	2,909
Tuao	Benguet	1,409	1,589
Tubao	Cagayán	4,986	4,800
Tubay	Unión	6,793	6,519
Tubig	Surigao	505	2,155
Tubigón	Samar	3,378	2,296
Tublay	Bohol	15,855	11,612
Tubungan	Benguet	996	1,182
Tuburan	Iloilo	4,368	5,317
Tudela	Cebu	10,760	8,264
Tuguegarao	do		
Tumauini	Cagayán	16,826	19,277
Tucucan	Isabela de Luzón	4,814	4,571
Tuy	Bontoc	407	403
Ubay	Batangas	10,150	11,011
Ubong	Bohol	3,552	3,639
Umingan	Nueva Vizcaya	977	
Unisan	Nueva Ecija	5,848	5,014
Urbiztondo	Tayabas	3,155	1,811
Urdaneta	Pangasinán	5,182	6,142
Usón	do	16,588	16,481
Valderrama	Masbate	2,105	1,966
Valencia	Antique	4,372	4,426
Valladolid	Bohol	6,904	7,032
Valle	Negros Occidental	14,000	10,207
Vega	Nueva Ecija		508
Vera	Catanduanes	2,896	2,927
Veruela	Dávao		
Victoria	Bután		
Vigan	Tarlac	10,362	10,234
Vilar	Ilocos Sur	19,000	14,249
Villaba	Bohol	6,665	6,243
Villa-Real	Leyte	2,257	2,495
Villasis	Samar	6,091	5,293
Villavieja	Pangasinán	11,968	7,383
Vintar	Abra	859	2,149
Virac (Birac)	Ilocos Norte	11,803	9,178
Zamboanga	Catanduanes	5,832	5,427
Zamboanguita	Mindanao	21,300	3,803
Zaragoza	Negros Oriental	5,603	4,869
	Nueva Ecija	5,250	5,907
	Zambales		
Zárraga	Iloilo	5,208	5,687
Zumárraga	Samar	4,561	5,465

## APPENDIX C.

### TABLES OF WEIGHTS AND MEASURES USED IN THE PHILIPPINES.

Hectoliter .....	{ = 2. 838	United States bushels.
	{ = 26. 417	United States gallons.
Kilogram .....	= 2. 2046	United States pounds.
Kilometer .....	= 0. 62137	United States mile.
Liter .....	= 1. 0567	United States quarts.
Meter .....	= 39. 37	United States inches.
Meter, square .....	= 10. 764	United States feet, square feet.
Meter, cubic (stere) ----	{ = 1. 307	United States cubic yards.
	{ = 35. 3	United States cubic feet.

The natives measure and sell rice and paddy by the caván and its fractions. The caván dry measure is as follows, viz:

4 apatáns.....	= 1 chupa.
8 chupas .....	= 1 ganta.
25 gantas .....	= 1 caván.
1 ganta .....	= 3 liters or 3.1701 United States quarts.

The equivalents of which in United States measure are:

1 apatán.....	= 0. 16875 of a pint.
1 chupa .....	= 0. 675 of a pint.
1 ganta .....	= 2 quarts, $1\frac{2}{3}$ pint.
1 caván .....	= 16 gallons, 3 quarts, 1 pint.

Rice of foreign importation is weighed and quoted by the picul, or 137.9 (Philippine) United States pounds, subdivided as follows:

16 taels.....	= 1 catty.
10 catties .....	= 1 chinanta.
10 chinantas .....	= 1 picul.

#### *Grain and liquid measures.*

1 caván.....	= 25 gantas = 75 liters.
1 ganta .....	= 8 chupas = 3 liters.
1 chupa .....	= $\frac{3}{8}$ liter.

Although the metrical system has been officially adopted in the Philippines, the following weights and measures of Spanish origin are more or less in use, viz:

Arroba (dry) = 25 libras = 25.36 pounds.

Arroba (liquid) = 4.263 gallons.

Bayon, a woven grass sack of indefinite capacity for the transportation of Filipino sugar.

Fardo, a local weight for tobacco, = 33 Spanish, pounds, = 33.475 United States pounds.

League = linear measure 2.634 United States miles.

Libra = weight measure 1.0144 pounds.

Milla = linear measure, 1,760 yards, or 1,609.3 meters.

Pie = linear 0.9478 foot.

Quintal (dry) = 4 arrobas = 101.44 pounds.

Quintal (metric) = 220.46 pounds.

Ton (tonelada), space measure, = 40 cubic feet.

Ton, weight measure = 20 metric quintals.

Vara, linear measure = 0.914117 yard, or 33.384 inches, United States.

1 hectare, land measure, Spanish = 2.471 United States acres.

1 quiñón, land measure, square, 100 loanes = 2.79495 acres; hectares = 6.89 acres.

The picul varies in different countries as follows:

Borneo and Celebes .....	135. 64	United States pounds.
China, Japan, and Sumatra .....	133½	United States pounds.
Java.....	135. 1	United States pounds.
Philippine Islands.....	137. 9	United States pounds.
16 piculs.....	= 1	ton, United States.
2 piculs.....	= 1	bale (hemp).
Liter (dry) .....	= 0. 908	quart.
Liter (liquid) .....	= 1. 056	quarts.
Tael.....	= 509. 75	grains troy.

## APPENDIX D.

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### LIST OF PHILIPPINE AGRICULTURAL PRODUCTS AND FIBER PLANTS.

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By Prof. F. LAMSON-SCRIBNER,  
*Chief, Insular Bureau of Agriculture.*

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#### INTRODUCTION.

There are a great many economic plants in the Philippines, some of much importance, forming articles of commerce between one island and another, or between the Islands and other countries of the world, others of less importance but often playing a significant part in the domestic economy of a few favored localities, while others still are utilized by wild tribes or under special circumstances. Like all races wholly or largely dependent upon their own resources for food and raiment, the people have acquired a close familiarity with the plants about them and have discovered uses for a multitude of native products which would have remained unknown to a more highly civilized and less dependent race. Several economic species now widely distributed throughout the Archipelago were introduced from America many years ago by the Spaniards. A great deal of good has been accomplished and the resources of the Filipinos materially increased as a result of this early work. These plants have been included in the list here presented, and a few have been included that are not strictly fruits or vegetables. They are products, however, which are common in the markets of Manila, having been grown or gathered by the small farmer, who derives a little income from their sale.

The information contained in this list is based very largely upon the reports of the correspondents of the Bureau of Agriculture, who have very generally and very fully replied to all our inquiries. These reports contain many names of economic plants which belong to this list, but which have been omitted, as they still remain unclassified. Efforts are now being made to identify these yet undetermined species and to verify the classification of those here submitted where there remains any doubt as to their proper identification. It is believed that the publication of

this list will help to incite an interest in Philippine agricultural products and assist in securing a wider and better knowledge of the wonderful resources of the islands.

#### FRUITS AND VEGETABLES.

This list is alphabetically arranged according to the native or local names. The several local or native names applied to any one plant appear together under the Latin name, the name under which the description occurs being in small caps.

ACELGA (Beet). *Beta vulgaris*, Linn.

A vegetable found nearly throughout the Archipelago, especially in Benguet; grown for local consumption. The leaves are used as a condiment, etc., and the fleshy roots are edible when cooked.

ACHIOTE. *Bixa orellana*, Linn.

A small tree, 20 to 30 feet in height, found throughout the Archipelago, although not largely grown; introduced from tropical America. The fruit yields a coloring matter and is used in cookery, to color butter, cheese, etc. The annatto of commerce.

ACHOTE. See *Achiote*.

ACHRAS SAPOTA, Linn. CHICO, Sapodilla, Sp. T.; Chicle, Eng.

ACHUETE. See *Achiote*.

ADAM'S NEEDLE. See *Camoteng cahoy*.

ADYANGAO. *Albizzia procera*, Benth.

A tree, furnishing a resin used as incense.

AGARIC. See *Payong ahas*.

AGARICO. See *Payong ahas*.

AGARICUS SP. *Payong ahas*, T.; Agarico, Sp.; Agaric or Mushroom, Eng.

AGATHIS LORANTHIFOLIA, Salisb.

A lofty tree, from which the valuable resin called "almáciga" (dammar of commerce) is extracted. It is found on the mountains of southern Luzon and Panay Islands at elevations of from 500 to 1,000 meters. The resin is sold in Manila at \$7 to \$8, Mexican, per picul. The best comes from the Camarines.

AGAYAC. *Phaseolus* Sp.

A bean grown in Cagayan Province in small quantities for local use.

AGAYAP. See *Agayac*.

AGUISIP. *Melastoma polyanthum*, Blume.

A tree, the bark of which yields a bright red coloring matter. This is used to dye hemp cloths.

AJO. See *Bawang*.

AJONJOLÍ. See *Lingá*.

ALANGILANG. See *Ilang-ilang*.

ALANIHAO. *Dracontomelon* Sp.

A native tree, 90 feet or more in height, found in Romblón and other islands. The fruit is edible.

ALBIZZIA PROCERA, Benth. ADYANGAO.

ALBIZZIA SAPONARIA, Blume. COGONTOCO.

ALCAPARRAS (Caper). *Capparis mariana*, DC.

A shrub, 7 feet high; the buds and fruits are used as a condiment; found in Rizal Province, very scarce.

ALEURITES SAPONARIA, Blanco. BAGUILUMBAN, T.; Balocanad. V.; Balucanang, II.; Calumban.

ALEURITES TRIOBA, Forst. Capili, LUMBANG, T.

ALIBANBAN (St. Thomas's Tree). *Bauhinia tomentosa*, Linn.

A small tree, 20 feet high, growing wild in Rizal and other provinces. The leaves yield an acid used as a substitute for vinegar.

ALIPAI. *Euphoria litchi*, DC.

A tree native of Luzon and other islands, yielding an edible fruit.

ALLIUM CEPA, Linn. Lasona; SIBUYAS, T.; Cebolla, Sp.; Onion, Eng.

ALLIUM SATIVUM, Linn. BAWANG, T.; Ajo, Sp.; Garlic, Eng.

ALLIUM TRICOCCUM, Ait. CUCHAY, Cutsay, T.; Ganda, V.; Wild Leek, Eng.

ALMACIGA (Pitch, Dammar of commerce). Valuable native resin extracted from trees belonging to the genera *Agathis*, *Canarium*, etc. Produced in large quantities in Mindanao Island for export, and quoted in Manila from \$7 to \$8, Mexican, per picul. The best is from Calamianes Islands.

ALMOND. See *Dalisay*.

ALOPAI. See *Alipai*.

ALPASOTES. *Chenopodium ambrosioides*, Linn.

A native herb found throughout the Archipelago. The leaves are used for seasoning food.

ALPAI. See *Alipai*.

ALPISTE (Canary grass or canary seed). *Phalaris canariensis*, Linn.

A grass grown rather for ornament in Abra, Ilocos Norte, and Ilocos Sur. The grain is used for feeding canary birds.

ALUPAY. See *Alipai*.

ALUPE. See *Alipai*.

AMAGA. See *Bolon̄gacta*.

AMARANTHUS SPINOSUS, Linn. Bayang-bayang, II.; Calites, V.; COLETES, T.; Colitis, T.; Cuanton; Harum, V.; Orayi.

AMARGOSO. See *Ampalayá*.

AMERI. See *Tayom*.

AMPALAYÁ (Balsam apple). *Momordica balsamina*, Linn.

An annual climbing plant 4 to 6 feet high; flowers yellow; grown for local consumption in Luzon and other islands. The fruit and leaves are used as condiment, for salad, etc. Two well-marked varieties are grown; both have a distinctive bitter taste.

AMPALEA. See *Ampalayá*.

ANACARDIUM OCCIDENTALE, Linn. Baludad, T.; Balubat, Pn.; Balurad, T.; Bologo, II.; CASOY, T.; Cashew, Eng.

ANANAS SATIVUS, Schult. PIÑA, T., Sp.; Pineapple, Eng.

ANANGCA. See *Langká*.



ANATTO. See *Achiote*.

ANGILANG. See *Ilang-ilang*.

ANIS CAHOY (Nutmeg). *Myristica philippinensis*, Lam.

A tree found growing naturally in Cavite and Laguna Provinces, and the Island of Cebú. The fruit or nut is used as a condiment.

ANIS ESTRELLADO (Fennel). *Fœniculum vulgare*, Gaertn.

A perennial plant, grown in very small quantities throughout the Archipelago. The seeds are used for dressing, sweetmeats, etc.

ANISOPTERA THURIFERA, Blanco. LAUAN or LAUA-AN, V.

ANISOPTERA OBLONGA, Dyer. SANDANA.

ANNOTTA. See *Achiote*.

ANONA MURICATA, Linn. Gayubano, Il.; Guanabano, P., Il.; Guayabano, T.; GUYABANO, T., V.; Guanabena, Eng.

ANONA RETICULATA, Linn. ANONAS, Sp., T.

ANONA SQUAMOSA, Linn. ATEs, T., Sp.; Atis, V.; Natis (?), P.; Sugar apple, Sweet-sop, Eng.

ANONAS (Custard apple). *Anona reticulata*, Linn.

An exotic tree, 10 to 20 feet or more high, from Mexico; grown for local consumption on Luzon. The fruit is 3 to 4 inches in diameter and considered excellent eating.

ANSIMAN (Purslane, pusley). *Portulaca oleracea*, Linn. See *Colasiman*.

ANTENG. See *Malapilé*.

ANTIDESMA BUNIUS, Spreng. BIGNAY, P.; Bugnay, T.

ANTIPOLO (Bread fruit). *Artocarpus incisa*, Linn. f.

A tree growing to a height of 40 to 60 feet, found throughout the Archipelago. It is sometimes planted. The sap, bark, and fruit are utilized. The fruit is valued for preserves, and is eaten when cooked.

AÑIL (Indigo, Eng.). See *Tayom*.

APALE or APARA (?). See *Ampalayá*.

APALIA (Balsam apple). See *Ampalayá*.

APASOTIS. See *Alpasotes*.

APIO (Celery). See *Quinsay*.

APITONG. *Dipterocarpus grandiflorus*, Blanco.

A tall tree which yields excellent resin sold in Manila market and exported; used for varnishing. Found in Luzon, Visayan, and Mindanao Islands.

APIUM GRAVEOLENS, Linn. Quinchay, QUINSAY, T.; Apio, Sp.; Celery, Eng.

APIUM PETROSELINUM, Linn. PEREJIL, Sp.; Parsley, Eng.

ARACHIS HYPOGAEA, Linn. MANÍ, T.; Cacahuete, Sp.; Groundnut, Peanut, Eng.

ARECA CATECHU, Linn. Boñga, BUÑGA, T.; Bonga, Sp.; Betelnut, Eng.

ARARAÓ (Bermuda arrow-root). *Maranta arundinacea*, Linn.

An herb sometimes grown for local use in Luzon and other islands. The starchy roots are used for making arrow-root and sago.

ARARÓ. See *Araraó*.

ARNOTTO. See *Achiote*.

ARONGAY (?) (Horseradish tree). See *Malungay*.

ARROZ (Rice). See *Palay*.

ARTOCARPUS CAMANSI, Blanco. CAMANCE, Camansi, V.; Camongsi, Dalingian, Dolongian, Pacac, Il.; Breadfruit, Eng.

ARTOCARPUS INCISA, Linn. f. ANTIPOLLO, T.; Rima, Sp., T.; Tipolo, P., V.; Tipoo, V.; Breadfruit, Eng.

ARTOCARPUS INTEGRIFOLIA, Linn. f. Anangca, Il.; LANGKĀ, Nangkā, T.; Jakfruit, Eng.

ARTOCARPUS RIMA, Blanco. Colo, V.; Ogob, B.; RIMA, T.; Breadfruit, Eng.

ARUNGAY (?). See *Malungay*.

ASPARAGUS. See *Espárrago*.

ASPARAGUS OFFICINALIS, Linn. ESPÁRRAGO, Sp.; Asparagus, Eng.

ASPLENIUM ESCULENTUM, Presl. PACÓ, T.

ATAY-ATAY. *Justicia corrosiva*, Linn.

An ornamental shrub planted in gardens; the leaves are used medicinally.

ATES (Sweet-sop, sugar apple). *Anona squamosa*, Linn.

A small tree or shrub, native of tropical America. It is highly prized for its edible fruit, used for local consumption. In season from June till November.

ATIMON (Melon). *Cucumis melo*, Linn. Var.

An herbaceous vine of Luzon and the Visayan Islands. The fruit is used for dessert, and is grown for local use.

ATIS (Sugar apple). See *Ates*.

AVERRHOA BILIMBI, Linn. Camias, T.; KAMIAS, B., T.

AVERRHOA CARAMBOLA, Linn. BALIMBING, Balinbin, Bilimbin, T.; Carambola, Coromandel gooseberry, Eng.

AZABACHE (Bean). *Phaseolus lunatus*, Linn.

A vegetable growing in Batangas and other places, though it is rarely cultivated. The fruit is used for food.

AZAFRAN. See *Dilao*.

BAGSANG. *Metroxylon rumphii*, Mart.

A very common palm in the Visayan Islands; grows spontaneously in moist regions. The heart of the tree is reduced to a sort of flour which is made into cakes or fritters and eaten with cocoanut milk. A wholesome and nutritious food.

BAGUILUMBAN. *Aleurites saponaria*, Blanco.

A native tree of Luzon and the Visayan Islands. The fruit is used in the manufacturing of an ordinary kind of soap sold in Manila.

BAKAO. *Rhizophora mucronata*, Lam.

A small tree growing in mangrove swamps throughout the Islands. The bark, fruit, etc., are utilized for dyeing and tanning purposes. The wood is much used as firewood.

BAKAWAN. See *Bakao*.

BALANTE. *Homalanthus populifolius*, R. Grah.

A tree whose bark, when dried and reduced to a powder, yields black coloring matter used by the natives for dyeing.

BALAO. *Dipterocarpus vernicifluus*, Blanco.

A tree growing wild in parts of Luzon, Mindanao, and the Visayan Islands, yielding a resin used for varnishing, calking ships, and illuminating.

BALATONG. *Phaseolus mungo*, Linn.

An herb, 3 feet high, grown on a commercial scale throughout the Archipelago. The seed constitutes a staple article of food. Sold by weight or by the cavan. Average market price 5 to 6 cents, gold, per pound.

BALIACAG (Yam, Chinese potato). See *Cobag*.

BALIMBING (Carambola). *Averrhoa carambola*, Linn.

A tree about 25 feet high, cultivated in gardens of Luzon and other islands. The fruit is eaten raw, used for desserts, etc.

BALINBIN. See *Balimbing*.

BALOCANAD. See *Baguilumban*.

BALONGAY. See *Malungay*.

BALSAM APPLE. See *Ampalayá*.

BALSAMINA. See *Ampalayá*.

BALSAMINA. *Momordica cylindrica*, Linn.

A trailing herb, cultivated as a garden vegetable around the city of Manila. The fruit and leaves are edible.

BALUBAD (Cashew). See *Casoy*.

BALUBAT. See *Casoy*.

BALUCANANG. See *Baguilumban*.

BALUNGAY (Horseradish tree). See *Malungay*.

BALURAD. See *Casoy*.

BANANAS. *Musa paradisiaca*, Linn. Var.

Bananas are grown to a great extent throughout the Archipelago. About 57 varieties are recognized. The fruit and leaves are utilized, as is also the flower bud.

BANCURO. *Morinda tinctoria*, Roxb.

A tree the root of which produces a red coloring material, used for dyeing purposes.

BANGÁ. See *Pugahan*.

BANGQUILING (Otaheite gooseberry). See *Ibá*.

BARET. See *Zacate*.

BARIT. See *Zacate*.

BASENG (Ginger). See *Luya*.

BATAD (Sorghum). *Sorghum saccharatum*, Moench.

A grass found in Iloilo, Masbate, Abra, etc., though rarely cultivated. The stem yields sugar, and the roots and seeds are also utilized. Alcohol can be obtained from the sap of this plant.

BATAG (?). See *Batad*.

BATAO. *Lablab cultratus*, DC.

A vine raised in small quantity in Albay, Bulacan, Negros Occidental, Nueva Ecija, Rizal, Tarlac, and Zambales. The fruit is used as vegetable.

BATATA (Irish potato). *Solanum tuberosum*, Linn.

A vegetable of American origin, found in Luzon and other islands. Raised to a considerable extent in Benguet. The tuberous root is used as an article of food.

BATAVIA. *Musa paradisiaca maxima*, Blanco.

A variety of banana, found in Luzon and other islands, and valued for its fruit.

BAUHINIA TOMENTOSA, Linn. ALIBANBAN, T.

BAWANG (Garlic). *Allium sativum*, Linn.

An herb raised in small quantity throughout the Archipelago. The leaves and bulb are used as a food and a condiment. Bulb white.

BAYABAS (Lemon guava). *Psidium guayava*, Linn. Var.

A tree or shrub 10 to 20 feet high, introduced from America, now found throughout the Philippine Islands. The fruit is valued for making jellies and preserves, and is used both locally and commercially.

BAYANG-BAYANG. See *Colletes*.

BEET. See *Acelga*.

BENESEED. See *Linjá*.

BERENGENA. See *Talong*.

BETA VULGARIS, Linn. ACELGA, Sp.; Beet, Eng.

BETELNUT. See *Bunãga*.

BETEL. See *Ikmo*.

BICACAO (Millet). *Setaria italica*, Beauv.

A grass found in Luzon, Cebú, etc., though rarely cultivated. The seed constitutes an article of food.

BIGNAY. *Antidesma bunias*, Spreng.

A tree growing wild in Pampanga, Rizal, and other provinces. The fruit is edible, and is good for preserves.

BILANG-BILANG. See *Dampalit*.

BILIMBIN. See *Balimbing*.

BISCO. See *Sabá*.

BITANHOL. *Calophyllum inophyllum*, DC.

A tree growing wild upon the seashores throughout the Archipelago. The seeds are used in making oil, and the bark yields a resin, both highly appreciated by the natives.

BITAOG. See *Bitanhol*.

BIXA ORELLANA, Linn. ACHIOTE, T.; Achote, Achuete, Sp.; Anatto, Annotta, Arnotto, Eng.

BLACK PEPPER. See *Pamintá*.

BOBOA. See *Lanzones*.

BOLOGO. See *Casoy*.

BOLONGAETA (Persimmon). *Diospyros pilosanthera*, Blanco.

A native tree producing edible fruit; Luzon and the Visayan Islands.

BONGA. See *Bun̄ga*.

BONGA. See *Bun̄ga*.

BOOCAN. See *Lanzones*.

BRASSICA OLERACEA, Linn. Var. REPOLLO, Sp., T.; Cabbage, Eng.

BRASSICA OLERACEA, Linn. Var. COLIFLOR, Sp.; Cauliflower, Eng.

BREADFRUIT. See *Artocarpus*.

BUCACAO (Millet). See *Bicacao*.

BUGNAY. See *Bignay*.

BULAHAN. See *Lanzones*.

BULAY. See *Batao*.

BUÑGA (Betelnut). *Areca catechu*, Linn.

A palm raised in all gardens throughout the Archipelago; it grows to a height of about 30 feet. The nut is chewed by the natives. The leaves, stalk, and seeds are also utilized. The nuts are valued at about 5 cents, gold, per hundred.

BUNĠULAN. *Musa paradisiaca suaveolens*, Blanco.

One of the best and most highly flavored varieties of banana, widely grown for its fruit.

BURI. *Corypha umbraculifera*, Linn.

A lofty and beautiful palm, very well known in the Philippines for its usefulness, giving name to the Island of Burias, where it is found abundantly. Sago of commerce is obtained from the soft interior part of the trunk. The fruit is edible, and tuba is obtained from an incision in the same. The tuba is made into wine and also a sort of sugar called *pacascás*, resembling maple sugar.

BUTINGA (Kidney bean). *Phaseolus vulgaris*, DC.

A common vegetable grown for local consumption only, in Batangas, Pangasinana, etc.

BUYO. See *Ikmo*.

CABATETE. *Rhamnus*, Sp.

A shrub, 9 to 12 feet high, found in Nueva Vizcaya. The leaves are edible.

CABATITI. See *Cabatete*.

CABBAGE. See *Repollo*.

CABIQUÍ. *Mimusops elengi*, Linn.

A native tree, about 40 feet high, with fragrant flowers and edible fruit, found on Luzon and other islands. It is sometimes planted in gardens.

CABITCABAG. *Mezoneurum glabrum*, Desf.

A native vine of Luzon and the Visayan Islands. The tender stems are cooked and used for making salad; the leaves are used medicinally.

CABUYAO. *Citrus torosa*, Blanco.

A variety of lemon grown in Luzon for local use. The rugose fruit is utilized in bathing and for bleaching, and is edible, though not ordinarily used as an article of food.

CACAHUETE. See *Mani*.

CACAO (Cocoa, chocolate bean). *Theobroma cacao*, Linn.

A shrub or small tree of great importance, found throughout the Archipelago, introduced from America in the sixteenth century. It is grown to a large extent. The seeds are used for making chocolate. Large quantities of cacao of excellent quality are produced in Southern Mindanao and District of Davao. The native product commands a better price than that imported from Singapore.

CADIOS. See *Caguios*.

CADIWS. See *Caguios*.

CAESALPINIA SAPPAN, Linn. Sapang, SIBUCAO or Palo campeche, T.; Palo-Brasil, Sp.

CAFÉ (Coffee). *Coffea arabica*, Linn.

A bush 8 feet high, more or less, found throughout the Philippine Islands. It is valued for the seed (berry), which is a staple product, the best quality being grown in Batangas.

CAGEL (Large lemon). *Citrus aurantium*, DC.

A lemon tree, growing on Luzon and other islands, whose fruit is highly esteemed, being one of the best varieties, valued at from 20 cents to \$1 per hundred. This tree furnishes a resin used for illuminating purposes.

CAGUINDI. See *Calit-calit*.

CAGUIOS. *Cajanus indicus*, Spreng.

A vegetable found in Occidental Negros, Romblón, Antique, etc., though rarely planted.

CAHAWA. See *Café*.

CAHIL. See *Cagel*.

CAJANUS INDICUS, Spreng. Cadios, Cadiws, V.; CAGUIOS, T.

CALABASANG PULÁ (Red squash). *Cucurbita maxima*, Duchesne.

Red squash is found throughout the Archipelago in several varieties which are grown for local use. The flowers and fruit are used for condiment, sweet-meat, etc.

CALABASANG PUTI (White squash). See *Upo*.

CALADI. *Colocasia esculenta*, Schott. Var.

A perennial herb raised in small quantity on Panay Island. The leaves, young shoots, and starchy roots are edible.

CALAMANSÍ (Small lemon). *Citrus mitis*, Blanco.

A small tree 10 to 15 feet high, found in nearly all gardens. The fruit, which is produced in great abundance, and leaves are utilized for condiments, and also in bathing, as a perfume. The fruit is also used as a substitute for limes. In the market at all seasons. Price 10 to 20 cents per hundred.

CALAMISMIS. *Psophocarpus tetragonolobus*, DC.

An herbaceous vine, grown as a garden vegetable. It is found in Luzon and Panay Islands, and grows wild in some places. The young pods are used for a condiment, salad, etc.

CALAMUNDING (Small lemon). See *Calamansi*.

CALAVAGA (Cucumber). See *Pepino*.

CALIT-CALIT. *Cissus acida*, Linn.

A low climbing herb, spontaneous in the Visayan and Luzon Islands. The young fleshy stems and leaves are edible and are used as a substitute for vinegar.

CALITES. See *Coletes*.

CALOPHYLLUM INOPHYLLUM, DC. BITANHOL, Bitag, T.; Dancalan, Din-calín, Tamaúan; Palo Marfa, Sp.

CALUMBAN. See *Baguilingban*.

CALUT. See *Namí*.

CAMACHILLÉ. *Pithecolobium dulce*, Benth.

A tree, 25 to 40 feet in height, found on Luzon Island, having been introduced from America. It grows spontaneously and the fruit is edible. The bark is used for tanning purposes and charcoal made from the wood is used in manufacturing gunpowder.

CAMALONGAY. See *Malungay*.

CAMALUGAY. See *Malungay*.

CAMALUSON. See *Calamismis*.

CAMANCE (Breadfruit). *Artocarpus camansi*, Blanco.

A tree, 60 feet or more in height, growing in Luzon, Antique, Iloilo, and other islands, though rarely cultivated. The seeds may be eaten raw or cooked. The flowers are used for sweetmeats.

CAMANCHILE. See *Camachilé*.

CAMANGEG (?). See *Sitao*.

CAMANGIAN. See *Sitao*.

CAMANSI. See *Camance*.

CAMANSILE. See *Camachilé*.

CAMAS. See *Sincamás*.

CAMATIS (Tomato). *Lycopersicon esculentum*, Mill.

An herbaceous plant from America. Several varieties are raised throughout the Archipelago. The fruit is utilized for dressing, sweetmeats, etc., and eaten raw or cooked. Usually marketed in Manila in two-bushel baskets, the price per basket varying from 20 cents to \$2, gold, according to the season.

CAMIAS. See *Kamias*.

CAMONGSI. See *Camance*.

CAMOTE (Sweet potato). *Ipomoea batatas*, Poir.

A trailing vine, many varieties of which are cultivated throughout the Archipelago, and constitute a staple product. The tuberous root and the leaves and shoots are the parts used. White and red varieties are found in Manila markets. Usually sold by number, price varying according to the size of the potatoes.

CAMOTI. See *Camote*.

CAMOTENG CAHOY (Cassava). *Manihot utilissima*, Pohl.

A shrub, about 10 feet high, of American origin. The well-known tapioca is extracted from the starchy fecula of its roots. It is found both wild and cultivated in some provinces. The natives make a good sweetmeat of the roots, which finds a ready sale among them.

CANANGA ODORATA, H. F. et T. Alaṅṅilang, T.; Aṅṅilang, V.; Ilang-ilang, Ylang-ylang, T., Sp.

CANARIUM ALBUM, Blanco. Pilani, T.; Pili, V.

CANARIUM GRACILE, Eng. Malapile; Anteng, Il.

CANARY GRASS. See *Alpiste*.

CANCONG. *Convolvulus repens*, Willd.

An aquatic vine, growing wild throughout the Archipelago. The stem is used in making salad, etc.

CANDONG. See *Colis*.

CANELA (Cinnamon). *Cinnamomum burmanni*, Blume.

A small tree or shrub whose bark is used as a spice. It is found in the Philippines, especially in Mindanao; and formerly was cultivated.

CANOBONG. See *Panarien*.

CAONG. *Caryota onusta*, Blanco.

A sort of sago is extracted from the fibrous stalk of this palm; and also tuba from an incision in the fruit.

CAPAYAS. See *Papaya*.

CAPER. See *Alcaparras*.

CAPILI. See *Lumbang*.

CAPPARIS MARIANA, D. C. ALCAPARRAS, Sp.; Capers, Eng.

CAPSICUM Sp. CHILE, Sile, T.; Pimiento, Sp.; Red pepper, Eng.

CAPSICUM MINIMUM, Roxb. CHILENG BUNDOC, T.; Pasitis; Guindilla, Sp.; Red pepper, Eng.

CARAMBOLA. See *Balimbing*.

CARAMPALIT. See *Dampalit*.

CARICA PAPAYA, Linn. Capayas, V.; PAPAYA, Sp., T.; Papaw, Eng.

CAROT. See *Nami*.

CARROT. See *Zanahoria*.

CARYOTA ONUSTA, Blanco. CAONG, Cauong, Iroc, T.

CARYOTA URENS, Linn. Baṅṅa or PUGAHAN, T.

CASHEW. See *Casoy*.

CASLA (Physic nut). See *Tuba*.

CASOY (Cashew). *Anacardium occidentale*, Linn.

A tall shrub, or finally a tree 30 to 40 feet high, grown sparingly on Luzon and other islands, having been introduced from tropical America. Fruit and seeds are edible, the former for dessert and the latter to mix with chocolate after being roasted. Oil is obtained from the seeds. Of much economic value.

CASSAVA. See *Camoteng cahoy*.

CASTANOPSIS Sp. TALACATAC (Wild chestnut).

CASTANOPSIS PHILIPPINENSIS, Vidal. TACATAC (Wild chestnut).

CASTOR OIL. See *Taṅṅantaṅṅan*.



CATIMON (Melon). See *Atimon*.

CATMON. *Dillenia philippinensis*, Rolfe.

A tree, the acid fruit of which is used by the natives as substitute for vinegar.

CATODAY. See *Katuday*.

CATUDAY. See *Katuday*.

CATURAY. See *Katuday*.

CAULIFLOWER. See *Coliflor*.

CAUONG. See *Caong*.

CAVILAN. See *Calit-calit*.

CEBOLLA. See *Sibuyas*.

CELERY. See *Quinsay*.

CHAMPACA. *Michelia champaca*, Linn.

A tree, 15 feet high, cultivated in gardens. A fine essence is extracted from its flowers.

CHENOPODIUM AMBROSIoidES, Linn. ALPASOTES, Apasotis, T.

CHICHARO (Peas). *Pisum sativum*, Linn.

A tendril-climbing herb, grown as a garden vegetable in Batangas, Bulacan, etc.

CHICLE. See *Chico*.

CHICO. *Achras sapota*, Linn.

A tree, 20 to 30 feet high, introduced from America and cultivated in gardens throughout the Archipelago. The fruit is edible and the sap yields valuable gum. It is highly appreciated.

CHICO MAMEY. See *Mamey*.

CHILE (Red peppers). *Capsicum* sp.

An herb or shrub, many varieties of which are cultivated as garden vegetables throughout the Archipelago. The leaves and fruit are used in cookery.

CHILENG BUNDOC (Red pepper). *Capsicum minimum*, Roxb.

A shrub found upon Luzon Island. It is sometimes planted and the fruit is used in cookery, etc.

CHILE PICANTE. See *Chile*.

CHINESE POTATO. See *Cobag*.

CICHORIUM ENDIVIA, Linn. ESCAROLA, T., Sp.; Endibia, Sp.; Endive, Eng.

CILANTRO. *Coriandrum sativum*, Linn.

An herb, raised in small quantity as a garden vegetable on Luzon and other islands, whose leaves, stem, and seed are used for dressing.

CINNAMOMUM sp. CANELA, T., Sp.; Cinnamon, Eng.

CINNAMON. See *Canela*.

CINNAMON VINE. See *Cobag*.

CIRUELAS. See *Siruelas*.

CISSUS ACIDA, Linn. Caguindi, V.; CALIT-CALIT, Cavilan, T.; Culutpamu, P.; Lan̄gingt, Lopó, Lopó-Lopó (?), Lupo, Pacopol, V.

CITRULLUS VULGARIS, Schard. PAKWAN, T.; Sandía, Sp.; Watermelon, Eng.

CITRUS AURANTIUM, DC. CAGEL, Cahil, T.; Large lemon, Eng.

CITRUS DECUMANA, Linn. LUCBAN, Suhâ, T.; Naranja, Sp.; Orange, Eng.

CITRUS MEDICA, Linn. LIMÓN REAL, Sp.; Lemon, Eng.

CITRUS MEDICA, Linn. Var. acida. DALAYAP, T.; Limón, Sp.; Lemon, Eng.

CITRUS MITIS, Blanco. CALAMANSÍ, Calamunding, T.; Limoncito, Sp.; Small lemon, Eng.

CITRUS NOTISSIMA, Blanco. DAYAP, T.; Limón, Sp.; Lemon, Eng.

CITRUS RETICULATA, Blanco. NARANJITAS, Sp.; Sintones, T.; Small oranges, Eng.

CITRUS TOROSA, Blanco. CABUYAO, T., P.; Colobot, T.

CIVET BEAN or SIEVA. See *Patané*.

CLUSTER FIG. See *Tibig na lalaqui*.

COBAG (Yam, cinnamon vine). *Dioscorea divaricata*, Blanco.

A tall, climbing plant with edible tubers. Found in Northern Luzon and the Visayan Islands; and is sometimes cultivated.

COCO (Cocoanut). *Cocos nucifera*, Linn.

A palm, widely cultivated throughout the Archipelago. Wine, vinegar, and many other products are manufactured from the sap, fruit, nut, leaves, veins, etc. Copra, the principal product, is largely exported. Green fruit is used in cookery. The little oil made here is locally consumed as an illuminant, as a cooking oil, and as a hair dressing.

COCOA. See *Cacao*.

COCOANUT. See *Coco*.

COCOS NUCIFERA, Linn. Niog, T.; Coco, Sp.; Cocoanut, Eng.

COFFEA ARABICA, Linn. CAFÉ, T., Sp.; Cahawa, M.; Coffee, Eng.

COFFEE. See *Café*.

COGONTOCO. *Albizzia saponaria*, Blume.

Yields resin for lighting purposes.

COLASIMAN (Purslane, pusley). *Portulaca oleracea*, Linn.

A trailing weed found throughout the Archipelago, but not cultivated.

The stem and leaves are edible and are used as a salad.

COLETES. *Amaranthus spinosus*, Linn.

A native herb, 2 to 3 feet high, found on Luzon, the Visayan Islands, etc. The ash made from the plant is used for dyeing; also used as vegetable greens in cookery.

COLIAT. *Gnetum* sp.

A small tree whose leaves and nut are edible, growing on Luzon and Panay Islands, though not cultivated.

COLIFLOR. *Brassica oleracea*, Linn. Var.

A vegetable found in Pampanga and other provinces but rarely raised. The bud is used for pickling.

COLIS. *Memecylon tinctorium*, Pers.

A tree growing spontaneously in Luzon and Visayan Islands. The leaves are used for dyeing purposes.

COLITIS. See *Coletes*.

COLO. See *Rima*.

COLOBOT. See *Cabuyao*.

COLOCASIA ANTIQUORUM, Schott. Var. Dagmay, V.; GABE, Gaby, T.; Gallang, B.; Gave, Il., Z.

COLOCASIA ESCULENTA, Schott. CALADI, V.

COLONG COLONG. *Hernandia peltata*, Meisen.

A native tree found in Luzon. Oil is made from the nut.

COMINO. See *Cilantro*.

CONDOL. *Cucurbita pepo*, Linn. Var. *aspera*.

An herbaceous vine, grown for local use in Luzon and other islands. The fruit is used for making sweetmeats, etc.

CONVOLVULUS REPENS, Willd. CANCONG, T.; Tancong, Tangecong, V.

CORCHORUS OLITORIUS, Linn. SALUYOT, I.

CORIANDRUM SATIVUM, Linn. CILANTRO, Comino, Sp.; Culantro, Ongsoy, T.

CORN. See *Mais*.

COROMANDEL GOOSEBERRY. See *Balimbing*.

COROT. See *Namí*.

CORYPHA UMBRACULIFERA, Linn. BURÍ, T.

CROCUS SATIVUS, Linn. DILAO, T.; Azafrán, Sp.; Saffron crocus, Eng.

CUANTON. See *Coletes*.

CUCHAY (Wild leek). *Allium tricoccum*, Ait.

A bulbous plant grown in the gardens of Luzon and other islands, occasionally spontaneous in Leyte. The leaves are used for condiment.

CUCUMBER. See *Pepino*.

CUCUMIS MELO, Linn. Var. Atimon, Catimon, V.; MELÓN, Sp.; Milón, T.; Melon, Eng.

CUCUMIS SATIVUS, Linn. Calavaga, V.; PEPINO, T., Sp.; Cucumber, Eng.

CUCURBITA LAGENARIA VILLOSA, Linn. Calabasang putí, Opo, Uro, T.; White squash, Eng.

CUCURBITA MAXIMA, Duchesne. CALABASANG PULÁ, Calabasang bilog, T.; Red squash, Eng.

CUCURBITA PEPO, Linn. Var. *aspera*. CONDOL, T., Sp.

CULANTRO. See *Cilantro*.

CULUTPAMU. See *Calit-calit*.

CUNALON. *Diospyros cunalon*, DC.

A tree, the bark of which, when dried and reduced to a powder, produces a black coloring matter used by the natives for dyeing purposes.

CUPANG. *Parkia roxburghii*, G. Don.

A resin useful for illuminating is extracted from this plant.

CUSTARD APPLE. See *Anonas*.

CUTSAY. See *Cuchay*.

DAGMAY. See *Gabe*.

DALANDAN (Small oranges). See *Naranjitas*.

DALANGIAN. See *Camance*.

DALAYAP (Lemon). *Citrus medica*, Linn. var. *acida*.

A shrub grown in the gardens of Luzon Island, etc. The fruit is used for seasoning.

DALIMA (Pomegranate). *Punica granatum*, Linn.

A shrub about 10 feet high, found in Luzon, Joló, etc. The fruit is edible, but the shrub is planted in gardens rather for ornament.

DALISAY ("Almond"). *Terminalia catappa*, Linn.

A tree, 30 to 40 feet high, growing spontaneously throughout the Archipelago, often used as a shade tree. The seeds are edible and are known as native almond. The true almond is *Amygdalus amygdalus*.

DALONGDONG. See *Bolon̄gaeta*.

DAMORTIS. See *Camachilé*.

DAMPALIT. *Sesuvium portulacastrum*, Linn.

A succulent branching herb, found in Luzon and other islands. The stems and leaves are used as a vegetable, especially for pickling.

DANCALAN. See *Bitanhol*.

DÁTILES. See *Rátiles*.

DAUA. See *Bicacao*.

DAUCUS CAROTA, Linn. Carrot, Eng.; ZANAHORIA, Sp.

DAYAP (Lemon). *Citrus notissima*, Blanco.

A shrub or very small tree, cultivated in the gardens of Luzon and other islands and highly prized. The fruit is used in cookery, etc.

DILAO (Saffron crocus). *Crocus sativus*, Linn.

A perennial herb, sparingly grown in Luzon and other islands. The root is used for seasoning.

DILLENIA PHILIPPINENSIS, Rolfe. CATMON, T.

DINCALIN. See *Bitanhol*.

DIOSCOREA ALATA, Linn. UBE, T.; Yam, Eng.

DIOSCOREA DIVARICATA, Blanco. Baliacag, V.; COBAG; Dulian, Il.; Obat; Paquit; Chinese potato, Yam, Cinnamon vine, Eng.

DIOSCOREA PAPILLARIS, Linn. Toñgô, Tun̄gô, T.

DIOSCOREA PENTAPHYLLA, Linn. LIMA, Lima-lima, Nami-conot, Sap-ang.

DIOSCOREA SATIVA, Lin. Var. Togui (?), TUGUE, Tugueng pulo, T.

DIOSCOREA TRIPHYLLA, Pers. Calut, P.; Carot, Il., V.; Corot, V.; Gayos, V.; Karot, Il.; NAMÍ, T.

DIOSPYROS CUNALON, DC. CUNALON.

- DIOSPYROS DISCOLOR, Willd. MABOLO, T.; Talang, P.; Persimmon, Eng.
- DIOSPYROS EBENASTER, Retz. SAPOTE, Zapote, T.; Persimmon, Eng.
- DIOSPYROS PILOSANTHERA, Blanco. Amaga, V.; BOLONGAETA, T.; Dalongdong, V.; Persimmon, Eng.
- DIPTEROCARPUS GRANDIFLORUS, Blanco. APITONG, Hapitong.
- DIPTEROCARPUS MALAANONAN, Blanco. MALAANONANG.
- DIPTEROCARPUS PILOSUS, Roxb. HAGACHAC or HAGACHAY, V.
- DIPTEROCARPUS TURBINATUS, Gaertn. MAYAPIS.
- DIPTEROCARPUS VERNICIFLUUS, Blanco. BALAO, T.; Malapahô, T., V.
- DISHCLOTH GOURD. See *Patola*.
- DOLICHOS ECHINULATUS, Blanco. QUIBAL.
- DOLICHOS SESQUIPEDALIS, Linn. Camangeg (?), Il.; Camangian, P.; Otong; SITAO, T.; Long yard bean, Eng.
- DOLONGIAN. See *Camance*.
- DRACONTOMELUM sp. ALANIHAO, V.
- DUJAT (Jambolan or Jambolan plum). *Eugenia jambolana*, Lam.  
A tree found in both a wild and a cultivated state on Luzon and other islands. The fruit is used for dessert.
- DULIAN. See *Cobag*.
- EGGPLANT. See *Talong*.
- ENDIBIA. See *Escarola*.
- ENDIVE. See *Escarola*.
- ESCAROLA (Endive). *Cichorium endivia*, Linn.  
A garden vegetable raised for local consumption on Luzon, etc. The leaves are used for salad.
- ESPARRAGO (Asparagus). *Asparagus officinalis*, Linn.  
An introduced garden vegetable raised in very small quantity in Cebú, Ilocos, and Manila. The young stalks are eaten when cooked.
- EUGENIA JAMBOLANA, Lam. DUJAT, T.; Lombuy, V.; Lomboy, Sp.; Lumboy, T.; Jambolan or Jambolan plum, Eng.
- EUGENIA JAMBOS, Linn. TAMPOY, T.; Rose apple, Jamrosade, Eng.
- EUGENIA MALACCENSIS, Linn. MACOPA, Macupa, T.; Yambo, P.; Pomarosa, Cuba; Otaheite apple, Eng.
- EUPHORIA LITCHI, DC. ALIPAY, T.; Alopay, Alpay, Alupay, Alupe; Lechía, Sp.
- FENNEL. See *Anis estrellado*.
- FICUS GLOMERATA, Roxb. TIBIG NA LALAQUI; Cluster fig.
- FICUS HISPIDA? ISIS.
- FOENICULUM VULGARE, Gaertn. ANIS ESTRELLADO, Sp.; Fennel, Eng.
- FRENCH PHYSIC NUT. See *Tuba*.
- FRIJOLES. See *Azabache*.

GABE. *Colocasia antiquorum*, Schott. Var.

A perennial herb cultivated throughout the Archipelago. The fleshy roots, leaves, and young shoots are used for food. Largely used as a substitute for potatoes.

GABY. See *Gabe*.

GALLANG. See *Gabe*.

GANDA. See *Cuchay*.

GARCINIA MANGOSTANA, Linn. MANGOSTÁN, T., Sp.; Mangosteen, Eng.

GARLIC. See *Bawang*.

GAVE. See *Gabe*.

GAYOS. See *Namî*.

GAYUBANO. See *Guyabano*.

GINGELLY. See *Linḡá*.

GINGER. See *Luya*.

GLORIA (Bananas). *Musa paradisiaca ternatensis*, Blanco.

High tree-like herb, very much appreciated and cultivated extensively for its valued fruit. Common in Central Luzon.

GNETUM, sp. COLIAT, T., V.

GOLDEN APPLE. See *Siruelas*.

GOOSEBERRY. See *Ibâ*.

GRANADA (Pomegranate). See *Dalima*.

GRAPE. See *Uvas*.

GROUNDNUT. See *Manî*.

GUANABANO. See *Guyabano*.

GUANABENA. See *Guyabano*.

GUAVA. See *Bayabas*.

GUAYABA. See *Bayabas*.

GUAYABANO. See *Guyabano*.

GUIJO. *Shorea guiso*, Blume.

A first-group tree, producing dark gray resin not highly esteemed, and growing in the mountains.

GUINDILLA. See *Chileng-bundoc*.

GUISANTE. See *Chícharo*.

GUTTA-PERCHA.

Gutta-percha is obtained in Mindanao and Paragua from several trees belonging to the genera *Palaquium* and *Payena*.

GUYABANO (Sour-sop, Guanabena, Suirsaak, Susakka). *Anona muricata*, Linn.

A tree, 20 feet or more in height, found in Luzon and the Visayan Islands, introduced from America. The fruit is edible and good for preserves. In season from August to October.

HABAS. See *Butinga*.

HAGACHAC or HAGACHAY. *Dipterocarpus pilosus*, Roxb.

A resinous big tree, found in Mindanao, Visayan, and Luzon Islands.

HAPITONG. See *Apitong*.

HERNANDIA PELTATA, Meisen. COLONG COLONG, T., V.

HARUM. See *Coletes*.

HEMIDESMA INDICA (*Zarzaparrilla*).

HEPTAPLEURUM CAUDATUM, Vid. LIMOLIMO.

HINCAMÁS. See *Sincamás*.

HOMALANTHUS POPULIFOLIUS, J. Grah. BALANTE or BALANTI, V.

HOPEA PLAGATA, Vid. YACAL.

HORSERADISH TREE. See *Malungay*.

HUMAY (Rice). See *Palay*.

IBÂ (Otaheite gooseberry). *Phyllanthus distichus*, Müll.

A tall shrub or small tree, about 20 feet in height, grown in gardens. The fleshy fruit is used for pickling and preserves, and is sometimes eaten raw, although strongly acid.

IKMO (Betel). *Piper betle*, Linn.

A climbing plant, found in Luzon and other islands. It is raised to a large extent in Pasay, Rizal Province, and some other places. The leaves are used for chewing only, together with a piece of betelnut and a bit of lime. The leaves are shipped to market in split bamboo crates holding several thousand. The leaves are very carefully arranged in layers with the upper surfaces all in the same direction.

ILANG-ILANG. *Cananga odorata*, H. F. et T.

A tree, 25 to 40 feet high, found throughout the Archipelago. It is highly prized and grown for commerce, especially around Manila, Mindoro Island, etc., being valued for its flowers, which yield a fine perfume. The essence called "Ilang-ilang" is exported to France, England, China, and Singapore.

INCAMÁS. See *Sincamás*.

INDIGO. See *Tayom*.

INDIGOFERA TINCTORIA, Linn. Ameri, B., C.; Mariana, Tagom, Tagum, V.; TAYOM, T.; Tayung, P.; Añil, Sp.; Indigo, Sp., Eng.

IPOMEA BATATAS, Poir. CAMOTE, Camoti, T.; Sweet potato, Eng.

IRISH POTATOES. See *Batatas*.

IROC. See *Caong*.

ISIS. *Ficus hispida*?

The very rough-scabrous leaves of this plant are used for cleaning floors, kitchen utensils, etc. Markets of Manila.

ITMO. See *Ikmo*.

JAKFRUIT. See *Langkâ*.

JAMAICA PLUM. See *Siruelas*.

JAMBOLAN or JAMBOLAN PLUM. See *Dujat*.

JAMROSADE. See *Tampoy*.

JASMINUM SAMBAC, Linn. SAMPAGUITA.

JATROPHA CURCAS, Linn. Casla, V.; tava-tava, Tawatawa, Il.; TUBA, T.;  
Physic nut or French physic nut, Eng.

JATROPHA MULTIFIDA, Linn. MANÁ, T., Sp.

JENGIBRE. See *Luya*.

JINCAMAS. See *Sincamás*.

JUSTICIA CORROSIVA, Linn. ATAY-ATAY, V.

KALAMISMIS. See *Calamismis*.

KAMAS. See *Sincamás*.

KAMIAS (Cucumber tree). *Averrhoa bilimbi*, Linn.

A small tree raised in gardens on the Island of Luzon. The agreeably acid fruit is used for dressing, sweetmeats, etc. The trees are very productive and the fruit is valued in Manila at from 10 to 30 cents per 100.

KAROT. See *Namí*.

KATUDAY. *Sesbania grandiflora*, Pers.

A native tree, 20 to 30 feet high, growing in Luzon. The flowers are used for salad, etc., and the resin medicinally.

LABANÓS (Radish). *Raphanus sativus*, Linn.

A vegetable grown to a large extent throughout the Archipelago. The root is edible.

LABLAB CULTRATUS, D. C. BATAO, T.; Bulay, P.

LACATAN. *Musa paradisiaca lacatan*, Blanco.

A variety of banana grown in Luzon and other islands for its fruit, which is highly prized. It is claimed to be one of the best varieties, on account of its superior flavor.

LACTUCA SATIVA, Linn. LECHUGA, Sp.; Lettuce, Eng.

LANĠINGĠ. See *Calit-calit*.

LANGKA (Jakfruit). *Artocarpus integrifolia*, Linn. f.

A tree, 20 to 30 feet high, raised in gardens throughout the Archipelago for local consumption. The fruit, which often weighs 60 to 70 pounds, is eaten raw or cooked, and is good for preserves. The oily seeds when boiled or baked somewhat resemble chestnuts.

LANSINA. See *Tañgantanġan*.

LANSIUM DOMESTICUM, Linn. Boboa, T.; Boocan, Bulahan, T.; Lanson, V.;  
LANZONES, Sp., T.

LANSON. See *Lanzones*.

LANZONES. *Lansium domesticum*, Linn.

A small tree of beautiful appearance, 15 feet or more in height, found in Luzon and other islands. Cultivated to a large extent in Laguna Province. The fruit is very highly esteemed as a dessert. Exported in considerable quantities to China in bamboo baskets holding about 20 pounds. Price 1 to 2 cents per pound.

LARGE LEMON. See *Cagel*.

LASONA. See *Sibuyas*.

LATONDAN. See *Letondal*.



LAUA-AN. See *Lauan*.

LAUAN. *Anisoptera thurifera*, Blanco.

A large tree that yields transparent, hard, and odorous resin of white-yellowish color esteemed in commerce and used as incense, the manufacture of varnishes, and for calking boats. Found throughout the Archipelago.

LAYAL (Ginger). See *Luya*.

LAYOHAN. See *Ibá*.

LECHfA. See *Alipai*.

LECHUGA (Lettuce). *Lactuca sativa*, Linn.

A garden vegetable locally raised throughout the Archipelago. The leaves are used for making salad.

LEERSIA HEXANDRA, Swartz. Baret, Barit, T.; ZACATE, Sp.

LEMON GUAVA. See *Bayabas*.

LETONDAL. *Musa paradisiaca cinerea*, Blanco.

A variety of banana, which is more widely cultivated in Luzon and other islands for its edible fruit. Introduced from India by a French clergyman named Mr. Letondal.

LETTUCE. See *Lechuga*.

LIMA. *Dioscorea pentaphylla*, Linn.

A vegetable growing in Luzon, Panay, Negros, Cebú, etc., though rarely cultivated. The tuberous root is edible.

LIMOLIMO. *Heptapleurum caudatum*, Vid.

Yields a resin used for making varnish.

LIMÓN. See *Dalayap* and *Dayap*.

LIMONCITOS. See *Limón suti*.

LIMÓN REAL. *Citrus medica*, Linn.

A small tree, a garden product of Luzon and Panay, valued for its fruit.

LIMÓN SUTI. *Triphasia trifoliata*, DC.

A shrub, growing spontaneously in Joló, Mindanao, Luzon, and Panay. The fruit is used for dressing, etc.

LINANCINA. See *Tañjantañgan*.

LINGA (Til or Teel, gingelly, beneseed). *Sesamum indicum*, Linn.

There are two varieties of sesamum grown in small quantities upon Luzon and other islands. An oil is extracted from the seeds which is used for culinary purposes. The oil is valued at about \$2, gold, per gallon. A limited amount of the oil is manufactured in Bulacan Province.

LOMBOY. See *Dujat*.

LOMBUY. See *Dujat*.

LONG YARD BEAN. See *Sitao*.

LOPÓ. See *Calit-calit*.

LOPÓ-LOPÓ (?). See *Calit-calit*.

LUCBAN (Pomelo or Grapefruit). *Citrus decumana*, Linn.

A tree 20 to 30 feet high, several varieties of which are planted in gardens throughout the Island of Luzon, Visayas, and Mindanao. The fruit is edible, but of inferior quality.

LUCUMA MAMOSA, Gaertn. MAMEY, T.; Chico Mamey, Sp.; Marmalade plum, Eng.

LUFFA ACUTANGULUS, Roxb. PATOLA, T.; Dishcloth gourd, Eng.

LUFFA AEGYPTIACA, Mill. PATOLA, T.; Sponge cucumber, Eng.

LUMBANG. *Aleurites triloba*, Forst.

A tree of Luzon and the southern islands. The seed yields an oil which is used as an illuminant but more especially as a substitute for linseed oil by painters. The pressed cake is used as a fertilizer by florists and has a local value of \$50, gold, per ton. The oil value at wholesale is 40 to 50 cents, gold, per gallon, and the nuts are valued at from \$65 to \$70, gold, per ton.

LUMBAY or LUMBIA. *Metroxylon silvestre*, Mart.

A palm from which a kind of flour is obtained, which serves as food to the poorer classes in times of scarcity.

LUMBOY. See *Dujat*.

LUPO. See *Calit-calit*.

LUY-A. See *Luya*.

LUYA (Ginger). *Zingiber officinale*, Linn.

A vegetable grown in Luzon and other islands for local consumption. The tuber or root is used for dressing, or as a spice.

LYCOPERSICUM ESCULENTUM, Mill. CAMATIS, T.; Tomate, Sp.; Tomato, Eng.

MABOLO (Persimmon). *Diospyros discolor*, Willd.

A native evergreen tree 12 to 15 meters high in Luzon and other islands. The edible fruit is deep crimson, and is covered with velvet-like bloom. Sometimes cultivated.

MACOPA (Otaheite apple). *Eugenia malaccensis*, Linn.

A tree, about 30 feet high, a garden product of Luzon and other islands. The fruit is edible.

MACUPA. See *Macopa*.

MAIS (Corn). *Zea mays*, Linn.

A cereal, introduced from America, many varieties of which are cultivated throughout the Archipelago. The grains are utilized for food, being a staple product. Commonly marketed in the ear either loose or in strings of one hundred.

MALAAANONANG. *Dipterocarpus malaanonan*, Blanco.

A large tree producing an aromatic resin used for calking.

MALAPAHÔ. See *Balao*.

MALAPILÊ or ANTENG. *Canarium gracile*, Eng.

Yields black pitch used for calking and lighting. Found throughout the Archipelago.

MALISA. See *Paminta*.

MALUNGAY (Horseradish tree). *Moringa oleifera*, Lam.

A native tree, about 15 to 25 feet high, found wild throughout almost the entire Archipelago; sometimes planted for its fruit, leaves, shoots, and roots, which are used for various purposes.

MAMEY (Marmalade plum). *Lucuma mamosa*, Gaertn.

A tall shrub growing in gardens in Laguna, valued for its fruit.

MAM-IN. See *Ikmo*.

MAMON. See *Ikmo*.

MAMPALAN. See *Mangá*.

MANÁ. *Jatropha multifida*, Linn.

A shrub growing wild in Bulacan and Rizal, though sometimes planted. The fruit is used as a purgative.

MANGÁ (Mango). *Mangifera indica*, Linn.

A tree 30 to 50 feet in height, grown to a large extent throughout the entire Archipelago. The fruit is harvested during spring and summer, and is highly esteemed for dessert, jelly making, etc.

MANGIFERA ALTISSIMA, Blanco. PAHÔ, Pajô, T.; Pao.

MANGIFERA INDICA, Linn. Mampalan, J., M.; MANGÁ, T.; Manga, Sp.; Mango, Eng.

MANGLE. See *Bakao*.

MANGO. See *Mangá*.

MANGOSTAN (Mangosteen). *Garcinia mangostana*, Linn.

A tree growing on Joló and Mindanao Islands, and known by the name of "king's fruit." The fruit is sweet and has very delicate flavor. It is much prized.

MANGOSTEEN. See *Mangostán*.

MANGROVE. See *Bakao*.

MANI (Groundnut, Peanut). *Arachis hypogaea*, Linn.

An herb cultivated in Luzon and other islands for forage. The seed is edible and is used for making oil, etc. Only sparingly eaten for food.

MANIHOT UTILISSIMA, Pohl. CAMOTENG CAHOY, T.; Adam's needle, Cassava or Yucca, Eng.

MANZANITAS. *Zizyphus jujuba*, Lam.

A tree planted in gardens in Cavite, Ilocos Norte, etc., yielding an edible fruit.

MARANTA ARUNDINACEA, Linn. ARARAÓ, T.; Araró, V., P.

MARIANA. See *Tayom*.

MARMALADE PLUM. See *Mamey*.

MARUNGAY. See *Malungay*.

MATAVIA. See *Batavia*.

MAYAPIS. *Dipterocarpus turbinatus*, Gaertn.

A tall resin-yielding tree. Found throughout the Archipelago.

MELASTOMA POLYANTHUM, Blume. AGUISIP.

MELÓN (Melon). *Cucumis melo*, Linn. var.

An herbaceous vine raised for local consumption in Panay, Luzon, etc. The fruit is valued for dessert, but is of inferior quality.

MEMECYLON TINCTORIUM, Pers. Candong, Il.; COLIS, T.; Saguinsin, V.

METROXYLON RUMPHII, Mart. BAGSANG.

METROXYLON SILVESTRE, Mart. Lumbia or LUMBAY.

- MEZONEURUM GLABRUM, Desf. CABITCABAG, Sagnit, Sapnit; Togabang, V.; Tugabang; Ugabang, V.
- MICHELIA CHAMPACA, Linn. CHAMPACA.
- MIJO. See *Bicacao*.
- MILÓN. See *Melón*.
- MILLET. See *Bicacao*.
- MIMUSOPS ÉLENGI, Linn. CABIQUÍ, T.
- MOMORDICA BALSAMINA, Linn. AMPALAYÁ, Ampalea, T.; Apale (?), Apalia, V.; Palayá, B.; Palla, Paria; Amargoso, Balsamina, Sp.; Balsam apple, Eng.
- MONGO. See *Balatong*.
- MORINDA TINCTORIA, Roxb. BANCURO.
- MORINDA UMBELLATA, Linn. SALICSICAN.
- MORINGA OLEIFERA, Lam. Arongay (?), Il.; Arungay (?), P.; Manungal, Balongay, Balungay, V.; Camalongay, Camalugay; MALUNGAY, T.; Marungay, Il., V.; Horseradish tree, Eng.
- MOSTAZA (Mustard). *Sinapis juncea*, Blanco.  
A vegetable growing in the gardens throughout the Archipelago. The leaves and seeds are used for condiment, etc.
- MUNGO. See *Balatong*.
- MUNTINGIA CALABURA, Linn. Dátiles, RÁTILES, T.
- MUSA PARADISIACA, Linn. Var. SAGUING, T.; Plátano, Sp.; Banana, Eng.
- MUSA PARADISIACA CINEREA, Blanco. Letondal, Latundan, Tundalán.
- M. PARADISIACA COMPRESA, Blanco. Bisco; SABÁ, T.; Sabá, Iloco; Plátano, Sp.; Banana, Eng.
- M. PARADISIACA LACATÁN, Blanco. LACATÁN, T.; Plátano, Sp.; Banana, Eng.
- M. PARADISIACA MAGNA, Blanco. Tondoc, T., V.; TUNDUQUE, T.; Plátano, Sp.; Banana, Eng.
- M. PARADISIACA MAXIMA, Blanco. BATAVIA, T.; Matavia, V.; Plátano, Sp.; Banana, Eng.
- M. PARADISIACA SUAVEOLENS, Blanco. BUÑGULAN, T.; Plátano, Sp.; Banana, Eng.
- M. PARADISIACA TERNATENSIS, Blanco. GLORIA, T.; Taranate, P.; Ternate, T.; Plátano, Sp.; Banana, Eng.
- MUSHROOM. See *Agaric*.
- MUSTARD. See *Mostaza*.
- MYRISTICA PHILIPPINENSIS, Lam. ANIS CAHOY, T.; Nuez moscada, Sp.; Nutmeg, Eng.
- NAMI. *Dioscorea triphylla*, Pers.  
A vegetable found in Luzon and the Visayan Islands. The root is eaten when cooked. In times of scarcity it becomes a staple article of food among the mountaineers. The juice is also used.
- NAMI-CONOT. See *Lima*.

NANGCA. See *Lankâ*.

NANGKĀ. See *Langkâ*.

NARANJA. See *Lucban*.

NARANJITAS (Small oranges). *Citrus reticulata*, Blanco.

A tree growing upon Luzon and other islands. The fruit is of the tangarine type and is highly prized, especially that from Laguna. It is grown commercially. The best orange grown in the Islands. In season from July to February and is valued at from 40 cents to \$2 per hundred.

NATIS (?). See *Ates*.

NICOTIANA TABACUM, Linn. TABACO, Sp., T.; Tobacco, Eng.

NIOG. See *Coco*.

NIPA. *Nipa fruticans*, Wurm. b.

One of the most useful of the native plants, growing throughout the Archipelago along the banks of estuaries and rivers affected by tides. The sap or "tuba" is largely used for making wine and alcohol; the leaves for roof-making, etc. Tuba when much fermented may be used as vinegar.

NIPA FRUTICANS, Wurm. b. NIPA, Sp., T.; Sasá, T.

NUEZ MOSCADA. See *Anis cahoy*.

NUTMEG. See *Anis cahoy*.

OBAT. See *Cobag*.

OCHROCARPUS PENTAPETALUS, Blanco. PAMITLAIN, Pamitlatin.

OGOB. See *Rima*.

OLASIMAN. See *Colasiman*.

ONGSOY. See *Cilantro*.

ONION. See *Sibuyas*.

OPO. See *Upo*.

ORANGE. See *Lucban*.

ORAYI. See *Coletes*.

ORYZA SATIVA, Linn. Humay; PALAY, T.; Arroz, Palay, Sp.; Rice, Paddy, Eng.

OTAHEITE APPLE. See *Macopa*.

OTAHEITE GOOSEBERRY. See *Ibâ*.

OTONG. See *Sitao*.

PACAC. See *Camance*.

PACHYRHIZUS ANGULATUS, Rich. Camas, B.; Hincamas, T.; Incamas, P., Pn.; Jincamas, T.; Kamas, Il.; SINCAMAS, T.; Ticamas, V.

PACÓ. *Asplenium esculentum*, Presl.

A common fern growing spontaneously in Luzon and other islands. The young leaves are used as a vegetable.

PACOPOL. See *Calit-calit*.

PADDY. See *Palay*.

PAGSAINGUIN or PISA. *Canarium cumingii*, Eng.

A tree found in the Archipelago whose black pitch is used for lighting and calking.

PAHÔ. *Mangifera altissima*, Blanco.

A tree produced in small quantity in Luzon and other islands. The fruit is highly prized and is utilized for pickling, etc.

PAJÔ. See *Pahô*.

PAKWAN (Watermelon). *Citrullus vulgaris*, Schrad.

An herbaceous vine grown in small quantity throughout the entire Archipelago. The fruit is used for dessert, the best being raised in Bulacan.

PALAQIUM sp. See *Gutta-percha*.

PALAY (Rice). *Oryza sativa*, Linn.

A cereal, hundreds of varieties of which are extensively cultivated throughout the Archipelago. The grains especially are used for food, and form a staple product.

PALAYÁ. See *Ampalayá*.

PALLA. See *Ampalayá*.

PAL-LAM. See *Calamismis*.

PALLANG. See *Calamismis*.

PALMA CHRISTI. See *Tañgantañgan*.

PALO-BRASIL. See *Sibucao*.

PALO MARIA. See *Bitanhol*.

PAMINTA (Black pepper). *Piper nigrum*, Linn.

A shrub growing in Luzon and Panay Islands, though rarely cultivated at present. Formerly extensively grown in Batangas. The fruit is used as a spice.

PAMITLAIN. *Ochrocarpus pentapetalus*, Linn.

A tree growing in Northwestern Luzon. The seeds yield an oil used for illuminating purposes.

PAMITLATIN. See *Pamitlain*.

PANAO. See *Balao*.

PANARIEN. *Tacca pinnatifida*, Forst.

A shrub, 6 feet or more high, cultivated in Antique, and very common in Ilocos and Zambales. The tuberous root is utilized in making a flour called "gaogao," sold in the Manila markets.

PANGAS. See *Luya*.

PAO. See *Pahô*.

PAPA. See *Batata*.

PAPAW. See *Papaya*.

PAPAYA (Papaw). *Carica papaya*, Linn.

A small tree, 20 feet high or more, of American origin, a garden product throughout the Archipelago. The fruit, which is orange-yellow when ripe, is sweet and pleasant to the taste and is used in making sauces, preserves, pickles, and for desserts, and is sometimes eaten raw.

PAQUIT. See *Cobag*.

PARAS. See *Ibá*.

PARIA. See *Amapalayá*.

PARNARIEN. See *Panarien*.

PARKIA ROXBURGHII, G. Don. CUPANG.

PARSLEY. See *Perejil*.

PASITIS. See *Chileng bundoc*.

PATANÊ (Sieva or civet bean). *Phaseolus lunatus*, Linn. var. *inamoenus*.

A climbing plant growing on Luzon and Panay Islands, etc. The seeds are used as an article of food for local consumption.

PATATA. See *Batata*.

PATOLA (Dishcloth gourd). *Luffa aegyptiaca*, Mill.

An annual tendril-climbing plant, grown as a garden vegetable throughout the Archipelago. The green fruit is edible, and is cooked like squash, or served in soups and stews. The fibrous interior of the dried fruit, when bleached, is used as a sponge for cleaning or scrubbing.

PATOLA (Sponge cucumber). *Luffa acutangula*, Roxb.

Cultivated as the preceding variety, for local consumption. The matted fibers of the strongly ribbed fruit of this variety or the preceding one is being exported from Japan for lining hats and slippers.

PATOLANG WAK (round). Same as *Luffa aegyptiaca*.

PAYENA sp. See *Gutta-percha*.

PAYONG AHAS (Agaric or mushroom). *Agaricus* sp.

An umbrella-shaped cryptogamous plant, found in Luzon and the Visayan and Mindanao Islands. The entire plant is edible. Many species of *Agaricus*, and genera related to them, grow spontaneously throughout the Archipelago.

PEANUT. See *Mani*.

PEAS. See *Chicharo*.

PECHAY. *Sinapis brassicata*, Blanco (?).

A herb grown as a garden vegetable in Luzon and other islands. The leaves are used.

PEPINO (Cucumber). *Cucumis sativus*, Linn.

A native cucumber of vigorous growth raised in small quantity throughout the Philippines. The fruit is of large size and excellent flavor and is used for making salad, etc.

PEREJIL (Parsley). *Apium petroselinum*, Linn.

A garden vegetable cultivated for local consumption.

PERSIMMON. See *Diospyros*.

PHALARIS CANARIENSIS, Linn. ALPISTE, Sp.; Canary grass or canary seed, Eng.

PHASEOLUS sp. AGAYAC, C.; Agayap, T., Pn.; Beans, Eng.

PHASEOLUS LUNATUS, Linn. AZABACHE, Zabache, T.; Fríjoles, Sp.; Beans, Eng.

PHASEOLUS LUNATUS INAMOENUS, Linn. PATANÊ, T.

PHASEOLUS MUNGO, Linn. BALATONG, Mungó, T.; Mongo, Sp.

PHASEOLUS VULGARIS, DC. BUTINGA, T., P.; Habas, Sp., T.; Beans, Eng.

PHYLLANTHUS DISTICHUS, Mull. Bangquiling, T.; IBĀ, T., P.; Layohan; Paras, V.; Otaheite gooseberry, Eng.

PHYSIC NUT. See *Tuba*.

PILANI. See *Pili*.

PILĪ. *Canarium album*, Blanco.

A tree found in Southern Luzon and sometimes planted. The nut and sap are utilized, the latter being produced on a commercial scale.

PIMENTA. See *Paminta*.

PIMIENTO. See *Chile*.

PINEAPPLE. See *Piña*.

PINUS INSULARIS, Endl.

Affords resin used for illuminating purposes. Found in Luzon.

PINUS MERCUSII, Jungh.

Tree producing a resin used by Igorrotes for illuminating purposes.

PIÑA (Pineapple). *Ananas sativus*, Schult.

An herb raised throughout the Archipelago for the flavor of its fruit, for local consumption.

PIPER BETLE, Linn. IKMO, Itmo, T.; Mam-in, P.; Mamon, V.; Samat, P., Buyo, Sp.; Betle, Eng.

PIPER NIGRUM, Linn. Malisa, P., Il.; PAMINTA, Pimenta, T.; Pimienta, Sp.; Black pepper, Eng.

PISA. See *Pagsainguin*.

PISUM SATIVUM, Linn. CHÍCHARO, T., Sp.; Guisante, Sp.; Peas, Eng.

PITCH. See *Almáciga*.

PITHECOLOBIUM DULCE, Benth. CAMACHILÉ, T.; Camanchile, T., Il.; Camansile, T.; Damortis, Il.

PLÁTANO DE MONO. *Musa paradisiaca*, Linn. var.

A variety of banana grown in some gardens on Luzon and other islands. The small round fruit is edible. The plant is also found wild in the mountains.

PLÁTANO COLORADO. *Musa paradisiaca*, Linn. var.

A variety of banana grown as a garden vegetable, the reddish fruit of which is edible.

PLÁTANO MORADO. *Musa paradisiaca*, Linn. var.

A variety of banana grown in gardens for local consumption.

POMEGRANATE. See *Dalima*.

PORAS. See *Ibá*.

PORTULACA OLERACEA, Linn. Ansiman, COLASIMAN, T.; Olasiman; Verdolaga, Sp.; Purslane, Pusley, Eng.

POTATO. See *Batata*.

PSIDIUM GUAYAVA, Linn. var. BAYABAS, Tayabas, T.; Guayava, Sp.; Lemon guava, Eng.



PSOPHOCARPUS TETRAGONOLOBUS, DC. CALAMISMIS, T.; Camaluson, V.; Kalamismis, T.; Pal-lam, Il.; Pallang; Seguidillas, T., Sp.

PUGAHAN. *Caryota urens*, Linn.

A palm producing a starch or a kind of sago of good quality.

PUNICA GRANATUM, Linn. DALIMA, J.; Granada, Sp., T.; Pomegranate, Eng.

PURSLANE. See *Colasiman*.

PUSLEY. See *Colasiman*.

QUIBAL. *Dolichos echinulatus*, Blanco.

An herbaceous vine, grown in Batangas in gardens for its edible fruit.

QUINCHAY. See *Quinsay*.

QUINSAY (Celery). *Apium graveolens*, Linn.

A garden vegetable growing throughout the Archipelago, used locally.

The leaf-stalk is used for salads and dressing.

RABANOS. See *Labanos*.

RADISH. See *Labanos*.

RAPHANUS SATIVUS, Linn. LABANÓS, T.; Rábano, Sp.; Radish, Eng.

RATILES. *Muntingia calabura*, Linn.

A small tree, about 15 feet high, of American origin, growing spontaneously in Luzon. The fruit is edible, though seldom used.

RED PEPPER. See *Chile* and *Chileng bundoc*.

RED SQUASH. See *Calabasang pulá*.

REPOLLO (Cabbage). *Brassica oleracea*, Linn. var.

A vegetable raised to a large extent in Luzon Island, etc., for local use. The leaves are edible.

RHAMNUS sp. CABATETE, Il.; Cabatiti, Il., Pn.

RHIZOPHORA MUCRONATA, Lam. BAKAO, Bakawan, T.; Mangle, Sp.; Mangrove, Eng.

RICE. See *Palay*.

RICINO. See *Tañgantañgan*.

RICINUS COMMUNIS, Linn. Lansina, Linancina; TANĠANTANĠAN, T.; Palma Christi, Ricino, Sp.; Castor oil plant, Eng.

RIMA. See *Antipolo*.

RIMA (Breadfruit). *Artocarpus rima*, Blanco.

A tree planted in the gardens of Luzon and other islands. When cooked the fruit is eaten, and is valued for making sweetmeats. This is the most prized of all the varieties of breadfruits; select fruits are valued at one peseta and upwards.

ROSE APPLE. See *Tampoy*.

SABÁ. *Musa paradisiaca compresa*, Blanco.

A variety of banana raised on a commercial scale throughout the Archipelago.

SABÁ ILOCO. See *Sabá*.

SACCHARUM OFFICINARUM, Linn. TUBÓ, T.; Caña dulce, Sp.; Sugar cane, Eng.

SAFFRON CROCUS. See *Dilao*.

SAGNIT. See *Cabitecabag*.

SAGUING. Native name for all kinds of bananas.

SAGUINSIN. See *Colis*.

SALICSICAN. *Morinda umbellata*, Linn.

A tree, from the roots of which the natives extract a red dyestuff.

SALUYOT. *Corchorus olitorius*, Linn.

A shrub, found in Ilocos Norte, sometimes planted. The leaves are eaten when cooked.

SAMALAGUI. See *Sampaloc*.

SAMAT. See *Ikmo*.

SAMBAG. See *Sampaloc*.

SAMBAGUI. See *Sampaloc*.

SAMBALAGUI. See *Sampaloc*.

SAMPAGUITA. *Jasminum sambac*, Linn.

A plant with white, fragrant flowers, from which a highly prized essence is produced.

SAMPALOC (Tamarind). *Tamarindus indica*, Linn.

A native timber tree, 30 feet or more in height. It is grown to a limited extent in Luzon, the Visayan Islands, etc., and is valued for its fruit, the meat of which is edible and serves for making preserves, syrup, dressing, etc.

SANDANA. *Anisoptera oblonga*, Dyer.

A tree like Lauan, and grows in southern Luzon and the Islands of Leyte and Mindanao. It yields an aromatic resin.

SANDIA. See *Pakuan*.

SANDORICUM INDICUM, Cav. SANTOL

SANTOL. *Sandoricum indicum*, Cav.

A tall tree grown in gardens throughout the Archipelago. Valued for its fruit, which is utilized for dessert, preserves, etc.

SAP-ANG. See *Lima*.

SAPANG. See *Sibucao*.

SAPNIT. See *Cabitecabag*.

SAPOLONGAN. See *Yacal*.

SAPOTE (Persimmon). *Diospyros ebenaster*, Retz.

A tree found in Cebu, Luzon, Mindanao, and Panay Islands, though rarely planted. The fruit is edible.

SEGUIDILLAS. See *Calamismis*.

SESAME. See *Lin̄ga*.

SESAMUM INDICUM, Linn. LIN̄GA, T.; Ajonjolí, Sp.; Sesame, Beneseed, Gingly, Til or Teel, Eng.

SESBANIA GRANDIFLORA, Pers. Catoday, Il.; Catuday, T., Il.; Caturay, P., Il.; KATUDAY, Il.

SESUVIUM PORTULACASTRUM, Linn. Bilang bilang, V.; Carampalit, P.; DAMPALIT, T.; Tarumpalit.

SETARIA ITALICA, Beauv. BICACAO, V., T.; Bucacao, Il.; Daua; Mijo. Sp.; Millet, Eng.

SHOREA GUIISO, Blume. GUIJO.

SIBUCAO or PALO CAMPECHE. *Caesalpinia sappan*, Linn.

A tree, 14 feet or more high, growing in Luzon and Panay Islands, which yields a red coloring material sold largely in Manila markets, and exported to China and England.

SIBUYAS (Onion). *Allium cepa*, Linn.

A vegetable grown throughout Luzon and the Visayan Islands. The bulb and leaves are used in cookery.

SIEVA or CIVET BEAN. See *Patané*.

SILE. See *Chile*.

SINAPIS BRASSICATA, Blanco (?). PECHAY, T.

SINAPIS JUNCEA, Blanco. MOSTAZA, Sp., T.; Mustard, Eng.

SINCAMAS (Yam bean). *Pachyrhizus angulatus*, DC.

An herbaceous vine grown to a large extent in Luzon, etc. The tuber is eaten raw or cooked.

SINTONES. See *Naranjitas*.

SIRUELAS (Golden apple, Jamaica plum). *Spondias* sp.

A tree, about 25 feet in height, found nearly throughout the Archipelago, and grown for its edible fruit.

SITAO (Long yard bean). *Dolichos sesquipedalis*, Linn.

A twining plant, cultivated in gardens throughout the Archipelago. A "snap" bean of excellent quality. The young pods and ripe beans are eaten. This bean is sold in the markets by the bunch of about twenty pods, at from 2 to 4 cents, gold, per bunch. There are two varieties, one with purple, the other with green pods.

SMALL LEMON. See *Calamansi*.

SMALL ORANGES. See *Naranjitas*.

SOLANUM MELONGENA, Linn. var. TALONG, T.; Berengena, Sp.; Egg plant, Eng.

SOLANUM TUBEROSUM, Linn. BATATA, T.; Papa, Patata, Sp.; Potato. Irish potato, Eng.

SORGHUM. See *Batad*.

SORGHUM SACCHARATUM, Moench. BATAD, V.; Batag (?); Sorghum, Eng.

SOUR-SOP. See *Guyabano*.

SPONDIAS sp. Siruelas, T.; Ciruelas, Sp.; Golden apple, Jamaica plum, Eng.

SPONGE CUCUMBER. See *Patola*.

SUGAR APPLE. See *Ates*.

SUGAR CANE. See *Tubó*.

SUHA. See *Lucban*.

SUIRSAAK. See *Guyabano*.

SUSAKKA. See *Guyabano*.

SUSONG CALABAO. *Unona* sp.

A small native tree growing in Luzon. The scarlet fruit, which contains sweet and milky sap, is edible. It is somewhat mawkish and insipid to the taste. Of local use only.

SUSONG DAMULAG. See *Susong calabao*.

SWEET POTATO. See *Camote*.

SWEET-SOP. See *Ates*.

TABACO (Tobacco). *Nicotiana tabacum*, Linn.

An herb, 3 to 5 feet high, of American origin, growing in Luzon and the southern islands, the best being that grown in Isabela and Cagayan. Many varieties are largely produced and exported to foreign markets. The leaves are used for making cigars, cigarettes, etc.

TABACOG. See *Melón*.

TACATAC (Wild chestnut). *Castanopsis philippinensis*, Vidal.

A tree of considerable height, growing wild upon Luzon and other islands. The fruit is edible.

TACCA PINNATIFIDA, Forst. Canobong, V.; PANARIEN, P. T.; Parnarien. II.; Tayobong, V.

TAGBAC-TAGBAC. See *Araraó*.

TAGOM. See *Tayom*.

TAGUM. See *Tayom*.

TALACATAC (Wild chestnut). *Castanopsis* sp.

A tall tree, found on Luzon and other islands, though not cultivated. The fruit is utilized.

TALANG. See *Mabolo*.

TALISAY. See *Dalisay*.

TALONG (Eggplant). *Solanum melongena*, Linn. var.

An herb, 3 feet high, cultivated as a garden vegetable, for local consumption only, throughout the Archipelago.

TAMARIND. See *Sampaloc*.

TAMARINDUS INDICA, Linn. Samalagui, Sambag, Sambagui, Sambalagui, V.; SAMPALOC, T.; Tamarindo, Sp.; Tamarind, Eng.

TAMAUIAN. See *Bitanhol*.

TAMPOY (Rose apple, Jamrosade). *Eugenia jambos*, Linn.

A tree raised as a garden product in Cebú, Luzon, and Panay. The fruit is edible and is used for making jelly.

TANCONG. See *Cancong*.

TANGANTANGAN (Castor oil). *Ricinus communis*, Linn.

A shrub growing spontaneously nearly throughout the Islands of Luzon, Visayas, and Mindanao, forming dense jungles. The seeds yield an oil much prized in commerce.

TANGCONG. See *Cancong*.

TAPIOCA.

A wholesome food article made from the starchy roots of *Yucca* or Cassava plant.

TARANATE. See *Gloria*.

TARUMPALIT. See *Dampalit*.

TAVA-TAVA. See *Tuba*.

TAWATAWA. See *Tuba*.

TAYABAS. See *Bayabas*.

TAYOBONG. See *Panarien*.

TAYOM (Indigo). *Indigofera tinctoria*, Linn.

A small leguminous shrub, about 5 feet in height, grown in Luzon and other islands. The entire plant, with the exception of the roots, furnishes a blue dyestuff known as indigo, which is much used in the industries. It is also raised to a considerable extent in Ilocos and Pangasinan, where the plant is known by the name of Indigo. There are other species cultivated, as *I. trifoliata*, Linn.; *I. trita*, Linn.; *I. hirsuta*, Linn.

TAYOBONG. See *Parnarien*.

TAYUM. See *Tayom*.

TAYUNG. See *Tayom*.

TEEL or TIL. See *Linṅá*.

TERMINALIA CATAPPA, Linn. DALISAY, Talisay; Almond, Eng.

TERNATE. See *Gloria*.

THEOBROMA CACAO, Linn. CACAO, Sp., T.; Cocoa, Eng.

TIBIG NA LALAQUI (Cluster fig). *Ficus glomerata*, Roxb.

A shade tree, growing by the streams, on Luzon. The fruit is small and is much relished by children, and also by cattle. The tree is highly valued by the natives for the reason that the roots yield drinking water.

TICAMAS. See *Sincamas*.

TIPOLO. See *Antipolo*.

TOBACCO. See *Tabaco*.

TOGABANG. See *Cabitcabag*.

TOGUE.

The first sprouts of the Balatong (*Phaseolus mungo* L.) are so called, which are eaten when cooked as a vegetable, and are indigestible.

TOGUI (?). See *Tugue*.

TOMATES. See *Camatis*.

TOMATO. See *Camatis*.

TONDOC. See *Tunduque*.

TONGÓ. *Dioscorea papillaris*, Linn.

A vine found wild, but sometimes planted for its edible root or tuber.

TRIGO (Wheat). *Triticum vulgare*, Willd.

A cereal grown in Batangas, Cagayan, Cavite, and Ilocos Norte, though rarely planted at present. The grain is used for making flour, which is made into bread.

TRIPHASIA TRIFOLIATA, DC. LIMON SUTI; Limoncitos, Sp.

TRITICUM VULGARE, Willd. TRIGO, Sp.; Wheat, Eng.

TUBA (French physic nut). *Jatropha curcas*, Linn.

A native shrub, about 8 feet high, found wild and planted for fences throughout Luzon and other islands. The fruit is used for making oil, and is purgative.

TUBÂ. A sweet liquid extracted either from the peduncle or fruit of many palms, such as: Nipa, cocoanut, buri, caong, pugahan, etc. Tubâ is a favorite drink of the natives, and is made into sugar, wine, alcohol, and vinegar, forming one of the important native industries.

TUBÓ (Sugar cane). *Saccharum officinarum*, Linn.

A tall grass, 8 to 15 feet high, several varieties of which are extensively cultivated throughout the Archipelago, especially in Pampanga and Negros. Sugar made from the juice of the stalks forms a staple product which is largely exported. The stalks are also marketed in large quantities for eating. They are sold in bundles of about a dozen stalks for 20 to 30 cents, gold, per bundle.

TUGABANG. See *Cabitcabag*.

TUGUE. *Dioscorca sativa*, Linn. var.

A vine grown as a garden vegetable, in Luzon and other islands. The tuberous root is edible.

TUGUENG PULO. See *Tugue*.

TUNDALAN. See *Letondal*.

TUNDUQUE (Banana). *Musa paradisiaca magna*, Blanco.

A variety of banana tree, grown on a small scale in Luzon and other islands as a garden product. The large fruit is edible.

TUNĠŌ. See *Toñgô*.

UBE. *Dioscorea alata*, Linn.

A climbing herb growing on Luzon and other islands, sometimes raised to a large extent. The tuber is used as an article of food.

UGABANG. See *Cabitcabag*.

UNONA sp. SUSONG CALABAO, T.; Susong damulag, P.

UPO (White squash). *Cucurbita lagenaria villosa*, Linn.

A staple garden vegetable throughout the Archipelago. The fruit sometimes exceeds one meter in length, and the price is governed by the size. Quality said to be excellent.

UVAS (Grape). *Vitis* sp.

A vine raised or planted in gardens in Albay, Ilocos Norte, etc., but rather for ornament than for fruit. The fruit is, however, used.

VATICA MANGACHAPUY, Blanco.

A tree of medium size, which yields resin.

VEGETABLE WAX. It is found in Calamianes, Paragua, etc.

VERDOLAGA. See *Colasiman*.

VITIS sp. Uvas, Sp.; Grape, Eng.

WATERMELON. See *Pakwan*.

WHEAT. See *Trigo*.

WHITE SQUASH. See *Upo*.

WILD CHESTNUT. See *Tacatac* or *Talacatac*.

YACAL. *Hopea plagata*, Vidal.

A lofty tree yielding transparent resin.

YAM. See *Cobag*.

YAM BEAN. See *Sincamas*.

YAMBO. See *Macopa*.

YLANG-YLANG. See *Ilang-ilang*.

YUCCA. See *Camoteng cahoy*.

ZABACHE. See *Azabache*.

ZACATE. *Leersia hexandra*, Swartz.

A grass which is cut by hand and sold green for feed for horses. An important industry in Manila.

ZANAHORIA. *Daucus carota*, Linn.

An herb cultivated for local use in Camarines, Cavite, Cagayan, etc. The root is edible.

ZAPOTE. See *Sapote*.

ZARZAPARRILLA (sarsaparilla).

The Indian sarsaparilla is grown locally for medicinal use.

ZEa MAYS, Linn. MAIS, T.; Maiz, Sp.; Corn. Eng.

ZINGIBER OFFICINALE, Linn. Baseng. Il.; Loyal, M.; LUYA, T.; Luy-a; Pangas, M.; Jengibre, Sp.; Ginger, Eng.

ZIZYPHUS JUJUBA, Lam. MANZANITAS, Sp.. T.

## A LIST OF PHILIPPINE FIBER PLANTS.

By F. LAMSON-SCRIBNER,

*Chief of the Insular Bureau of Agriculture.*

[The species in the following list are arranged alphabetically by their Latin or scientific names.]

Scientific and local or native names.	Distribution.	Part used.	Uses, etc.
Abroma angusta Linn. (Sterculiaceae). Anabó, T., B., V., Il.; Anabu, P.; Anafu, Il.; Anagbo, V.; Annabo, Z., Pn., Il.; Devil's Cotton, Eng.; Nabo, V.; Tanabo, V.	Luzon and the Visayan Islands.	Inner bark ---	Twine, thread, ropes, fishing lines, pouches, etc. Fiber compares favorably with jute; 2 meters long; \$4, Mexican, per picul.
Abroma sp. (Sterculiaceae) --- Cáñamo, Sp.; Lapnit, Il.	Northern Luzon -----	do -----	Twine, ropes, etc.
Abutilon indicum (Malvaceae) --- Malva, Sp., T.	Luzon and the Visayan Islands.	Bark -----	Ropes.
Agave rigida Mill. (Amaryllidaceae). Amaguey, Pn.; Magay, V.; Maguey, T., Il.; Henequen (Mex.); Pita, Sp.; Sisal Hemp, Eng.	Northern Luzon southward to Iloilo and western Negros.	Leaves -----	Ropes, twine, etc.; raised commercially in Ilocos Norte; 800 to 1,000 plants per hectare; yield 10 piculs per hectare; \$5 to \$8, Mexican, per picul.
Alstonia sp.? (Apocynaceae) --- Jinguio, T.	Batangas and Camarines.	Stem -----	Used in making fish corrals
Anamirta cocculus, Wight et Arn. (Menispermaceae). Labtang, Il.; Suma, P.	Union and Pampanga	-----	Used tying and binding.
Ananas sativa Linn. (Bromeliaceae). Pineapple, Eng.; Piña, Sp., T., etc.	Luzon, Visayan, and Mindanao Islands.	Fiber from leaves.	Fine cloths, dress goods, shirts, etc.; six leaves yield 1 ounce fiber, more or less.

*A list of Philippine fiber plants—Continued.*

Scientific and local or native names.	Distribution.	Part used.	Uses, etc.
<i>Andropogon acicularis</i> Spr. (Gramineæ). Morisico, V.; Morosico, Mursicos, T., V.	Bohol and Masbate Islands, etc.	Straw	Hats and mats.
<i>Anisoptera thurifera</i> Blanco (Dipterocarpaceæ). Lauan or Lauaan, V.	Visayan Islands	Inner bark.	
<i>Anona reticulata</i> Linn. (Anonaceæ). Anonas, Sp., T.	Luzon Island	do	Cordage.
<i>Areca catechu</i> , Linn. (Palmae). Betelnut, Eng.; Bonga, Būnga, T.; Bonga, Sp.	Luzon and other islands.	Bark of the fruit.	Brown paper.
<i>Artocarpus camansi</i> Blanco. (Moraceæ). Pacac, Il.; Camance, Camansi, V.; Dalangian, Dolongian, Il.	do	Inner bark; very strong fiber.	Cordage.
<i>Artocarpus incisa</i> Linn. (Moraceæ). Antipolo, Rima, T.; Tipolo, P., V.; Tipoo, V.	do	Inner bark	Twine.
<i>Artocarpus</i> sp. (Moraceæ) — Tugop, V.	Capiz	do	
<i>Bambusa arundo</i> L. (Gramineæ). Bokawe, Bucawe, T.; Caña, Sp.; Bamboo, Eng.	All islands	Outer portion of stem.	Lattice work, etc.
<i>Bambusa blumeana</i> R. and S. (Gramineæ). Kawayan, T. (generic name for bamboo); Caña, Sp.; Bamboo, Eng.; Quian, P.	do	do	Posts, rafts, etc., of native houses, and hats, cigar and cigarette cases, etc.
<i>Bambusa vulgaris</i> Wendl. (Gramineæ). Caña de China, Sp.; Kawayang China, T.	Luzon Island	Stem	Ornament and making fancy furniture; yellow and green striped species.
<i>Bambusa</i> sp. (Gramineæ): Quian Bical, P.	Pampanga	do	Construction of houses, fences, etc.
Quian Baugin	do	do	Do.
Bojo, T., P.	Luzon and other islands.	do	Do.
Butong, V.	Negros Island	do	Do.
Calangsi, V.	do	do	Do.
Kawayang Kiling, T.; Quian Kiling, P.	Luzon and other islands.	do	Do.
Quian Timbu	Pampanga	do	Do.
<i>Bauhinia scandens</i> Blanco (Leguminosæ). Banhot, V.; Banot, T.	Luzon, Negros, and other islands.	Inner bark	Ropes, cords, bowstring.
<i>Bauhinia tomentosa</i> Linn. (Leguminosæ). Salibangbang, Alibanban, T., V.; Balibanban, Marulinao, Diis, Ahihiro, Alambihor, Alibihil, P.	Luzon and the Visayan Islands.	Bark	Cordage.
<i>Beaumontia</i> sp.? (Apocynaceæ). Hinguio, Jinguio, B., T.	Batangas, Camarines, Tayabas, etc.	The vine-like stem.	Fish nets and corrals, \$1, Mexican, per arroba.
<i>Boehmeria nivea</i> Gaud. (Urticaceæ). Ramie, Eng.; Ramio, Sp.	Albay, Negros Occidental, etc.	Bark	
<i>Boehmeria</i> sp.? (Urticaceæ): Cagay, V.	Negros Occidental		
Lapnis, V., T.	Camarines, Tayabas, etc.	Bark	Twine.
<i>Bombax malabaricum</i> DC. (Bombacaceæ). Malabulac, Maracapas, Il., T., Z.	North and central Luzon.	Inner bark	Ropes, stuffing, cigar cases, etc.
<i>Calamus albus</i> <sup>1</sup> , Nav. (Palmae). Bejuco, Sp.; Calapi, V.; Rattan, Eng.	Masbate, Sorsogon, etc.	Stem	Canes.
<i>Calamus buroensis</i> Nav. (Palmae). Talola, Talora, T., V.; Bejuco, Sp.; Rattan, Eng.	Southern Luzon	do	Beds, chairs, lashings, ropes, etc.
<i>Calamus coccineus</i> Nav. (Palmae). Bejuco, Sp.; Ouay na pula, Z.; Rattan, Eng.	Zambales and other provinces.	do	General uses of rattan.

<sup>1</sup> This variety is probably the same as *Calamus maximus*.



<sup>1</sup> Generic name for rattan

*A list of Philippine fiber plants—Continued.*

Scientific and local or native names.	Distribution.	Part used.	Uses, etc.
Calamus sp. (Palmae)—Cont'd.			
Iloag, V	Visayan Islands		
Iruad, Il	Benguet		
Jamuy, Z	Zambales	Stem	Chairs and fish corrals.
Janamjam, V	Bohol	do	General uses of rattan.
Jipguid, V	Iloilo	do	Fish traps.
Joag, V	Negros Occidental	do	Tying or lashing in house building.
Juag, V	Bohol	do	Roofing and fish corrals.
Juay, V	Luzon and other islands.		
Labing, B	Southern Luzon	Stem	Tying, baskets, chairs, lattice, window blinds.
Labney, Pn	Pangasinan		
Labnig, B	Southern Luzon	Stem	General uses of rattan.
Lambotan, T	Tayabas		
Lamuran, T	Bulacan		
Lauay baboy or Samulid, T	Batangas		
Lilimbuyen, Pn	Pangasinan		
Lipat-lipat, V	Negros Occidental	Stem	Used for making canes, ropes, furniture, etc.
Lipay, T	Tayabas		
Locoan, V	Masbate	Stem	Binding and lashing.
Lontoc, V	Negros Occidental		
Lucuan, V	Masbate		
Lum-an, V	do		
Magabay, V	Romblon	Stem	Tying and binding.
Magbagacay, V	Negros Occidental		
Magtaguetic, V	Masbate	Stem	Chairs.
Malabotang, V	Negros Occidental		
Malagoquing, V	do		
Mambotan, T	Tayabas	Stem	Binding and lashing.
Mamugtung, P	Tarlac	do	Cordage.
Mamunting, P	do	do	Do.
Mangnao, V	Negros Occidental	do	Binding and lashing.
Mungao, C	Cagayan	do	General uses of rattan.
Nacot, B	Southern Luzon	do	Binding and lashing.
Nag, B	do	do	Do.
Nanga, V	Romblon	do	Do.
Napus, B	Camarines	do	Ropes.
Nicop, B	Southern Luzon		
Nicot, B	do		
Nocot, B	do	Stem	Tying purposes.
Nocotnag, B	do	do	Do.
Oay, B., T., Il	Luzon and other islands.	do	Ropes, chairs, etc.
Oey, Pn	Pangasinan		
Oay-babae, V	Masbate		
Oay-babai-ye, M	Surigao		
Olas, B	Camarines		
Paalis, T	Tayabas		
Padios, B	Camarines	Stem	Lattices.
Pudlos, V., M	Visayan and Mindanao Islands.		
Pait, B	Camarines		
Palmoc, B	Albay, Camarines	Stem	Canes.
Palimanao, T	Bulacan		
Panlis, T	Tayabas		
Panlitocan, V	Negros Occidental		
Pansilanon, V	do		
Pasan, V	Bohol		
Payasan, M	Surigao		
Pusi, Il	Abra	Stem	Whips, canes.
Querquersang, Il	Union		
Red Rattan, Eng	Zambales	Stem	Cordage.
Remoran, V., B	Southern Luzon and the Visayan Islands.		
Remuran, V	Masbate		
Sadat, Il	Union		
Saja-an, V	Negros Occidental		
Sajajan, V	Masbate		
Samolig, B	Southern Luzon	Stem	Canes.
Samulig, B	do	do	Do.
Sangumay, T	Rizal Province	do	Hats, chairs, twine.
Sarmientos, V	Antique, Negros Occidental.		
Siag, B	Albay		
Sig-id, V., M	Surigao, Negros Occidental.	Stem	Tying purposes.
Sigid, V	Bohol	do	Fish corrals.
Tagsaon, V	Masbate		
Tagsahon, M	Surigao		
Tagolaoy, V	Bohol		

## A list of Philippine fiber plants—Continued.

Scientific and local or native names.	Distribution.	Part used.	Uses, etc.
<i>Calamus</i> sp. (Palmae)—Cont'd.			
Taguiti, V.	Negros Occidental		
Talaran, V.	do		
Talipupo, T.	Bulacan		
Talolo, V.	Marinduque		
Talonton, V.	Negros Occidental		
Tamalola, V.	do	Stem	Binding and lashing.
Tamalura, V.	do	do	Do.
Tamarura, V.	Romblon		
Tanamjam, V.	Negros Occidental		
Tandalora, B., V.	Albay, Masbate		
Tandarora, B.	Albay		
Tandarura, V., B.	Southern Luzon, etc.		
Tararura, B.	Camarines		
Tapniguid, M.	Surigao		
Tatula, T.	Batangas		
Tinalintin, T.	Tayabas		
Tocong, Pn.	Pangasinan		
Tomarom, V., B.	Sorsogon		
Tumaguictic, V., B.	Masbate, Sorsogon, etc.		
Tumalim, T.	Southern Luzon	Stem	Do.
Tumalon, V.	Romblon		
Tumarom, B.	Southern Luzon	Stem	Chairs, hammocks, traveling bags, etc.
Uag, B.	Albay		
Uay, T.	Luzon and other islands.	Stem	Hats, pocket cases, and other articles.
Uay-babae, V., B.	Sorsogon		
Ubao, B.	Camarines	Stem	Ropes.
Uban-uban, B.	do		
Uii, Z.	Zambales		
Uway, T.	Abra, Bulacan, Rizal, etc.	Stem	Tobacco pouches, hats, baskets, chairs, pocketbooks, traveling bags, jewel cases, etc.
Yantok, T.	All islands		
<i>Callicarpa cana</i> Linn. (Verbenaceae).	Negros Occidental	Inner bark	Cordage.
Hanagdong, V.			
<i>Callicarpa</i> sp. (Verbenaceae)	Laguna		
Hinguio, T.			
<i>Caryota onusta</i> Blanco (Palmae).	Luzon, Masbate, and other islands.		
Caong, P., T.; Edioc, V.			
<i>Caryota urens</i> L. (Palmae)	Luzon and other islands.	Leaves and fiber surrounding stem, which is called "cabonegro."	Strong rope, twine, etc.
Anibong, T.; Cabonegro, Sp.; Idioc, eruc, V.; Idiok, B.; Iroc, T.; Jidioc, V.			
<i>Caryota</i> sp. (Palmae)	Ilocos Norte and Pangasinan.	Leaves	Large hats.
Darumacá?, Il., Pn.			
<i>Ceiba pentandra</i> Gaertn. (Bombacaceae).	Luzon and other islands.	Fiber on seeds	Stuffing pillows, mattresses, etc.
Algodoncino, Sp.; Bobuy, Bulac doidol, Bulac dondol, V.; Capas, Capas nga babaret, Pn.; Capasanglai, Pn., Il.; Capos, Pn.; Cayo, B.; Cotton, Eng.			
<i>Clerodendron intermedium</i> , Cham. (Verbenaceae).	Pangasinan.		Pouches.
Colo-co-lot, Pn.			
<i>Cocos nucifera</i> Linn. (Palmae).	All islands.	Covering of nut, leaves, and veins.	Brushes, ropes, coarse cloth, etc.
Coco, Sp.; Coconut, Eng.; Nio, T.			
<i>Columbia serratifolia</i> DC. (Tiliaceae).	Luzon and the Visayan Islands.	Inner bark	Cordage, twine, rope, etc.
Alinao, Il.; Anilao, T., V.; Anilo, Anulo, P.; Linao, V.			
<i>Corchorus acutangulus</i> Linn. (Tiliaceae).	Northern Luzon	do	Cordage, rope, etc.
Saluyot, Il., Pn., T.			
<i>Corchorus olitorius</i> Linn. (Tiliaceae).	Luzon	Inner bark extracted by maceration.	Sacks, ropes, harnesses for working animals.
Pasao, T., P.			

<sup>1</sup> Generic name for rattan.

*A list of Philippine fiber plants—Continued.*

Scientific and local or native names.	Distribution.	Part used.	Uses, etc.
<i>Cordia blancoi</i> Vidal (Borraginaceæ). Sinaligan, Il.	Abra -----	Inner bark	Cigar cases.
<i>Cordia myxa</i> Linn. (Borraginaceæ). Anonang, B.	Southern Luzon -----	do -----	Cordage.
<i>Corypha minor</i> Blanco (Palmeæ). Anaao, Il.; Anahao, P., V.; Anahaw, V., T.; Anaao, P.	Luzon and the Visayan Islands.	Leaves -----	Hats, cloaks, fans, mats, etc.
<i>Corypha umbraculifera</i> Linn. (Palmeæ). Boli, Buló, T. P.; Bulí, T., M.; Buri, T.; Silac, Silag, Il., Pn.	All islands -----	Leaf stalk, leaves.	Hats, mats, sacks, ropes, brooms, clothes chests, baskets, bags, pocket cases, etc.; buntal hats made of the leaf-stem fiber.
<i>Crinum asiaticum</i> Linn. (Amaryllidaceæ). Bacong, V.	Visayan Islands -----	Inner bark	Twine, rope.
<i>Cyathula prostrata</i> Blume (Amarantaceæ). Amorseco, Sp., T.; Variri, V.	Luzon and other islands.		
<i>Cyperus difformis</i> Linn. (Cyperaceæ). Bangkwang?, T.	Rizal -----	Leaves -----	Hats, mats, strings.
<i>Dendrocalamus flagellifer</i> Munro (Gramineæ). Bojo, T., Il.	Luzon -----	Outer part of stalk.	Hats, baskets, etc.
<i>Desmodium gangeticum</i> and <i>diversifolium</i> , DC. (Leguminosæ). Mangquit, T.	Tayabas -----		
<i>Entada scandens</i> Benth. (Leguminosæ). Gogo, T.; Balogo, Bayogo, V., P.	Luzon and the Visayan Islands.	Bark -----	Cleaning the hair, hairy skins, lather, etc.; the fiber is saponaceous.
<i>Ficus indica</i> Linn. (Moraceæ). Balete, B., T.; Batiti, V.	do -----	Inner bark	Ropes.
<i>Ficus macrocarpa</i> Linn.? (Moraceæ). Payapa, V.	Visayan Islands -----	do -----	
<i>Flagellaria indica</i> Linn. (Flagellariaceæ). Balanguay, P.; Balinguay, T.; Balinguay, T.	Luzon -----	do -----	Twine.
<i>Gnetum gnemon</i> Linn. (Gnetaceæ). Bago, V.; Callat, Pn.; Culi, P.	Luzon and the Visayan Islands.	do -----	Cordage, twine, cigar cases.
<i>Gnetum latifolium</i> Blume (Gnetaceæ). Salago, V.	do -----	do -----	Cordage.
<i>Gnetum scandens</i> Roxb. (Gnetaceæ). Colias, T.	Central Luzon -----	Stem -----	Do.
<i>Gossypium arboreum</i> Linn (Malvaceæ). Bulac cahoy, T.; Algodon, Sp.; Tree Cotton, Eng.	Luzon and other islands.	Lint on seeds	Pillows, mattresses, fish line, candlewick, reins, whips, etc.
<i>Gossypium barbadense</i> Linn. (Malvaceæ). Janovitch Cotton, Eng. <sup>1</sup>	Negros Occidental -----	do -----	
<i>Gossypium herbaceum</i> Linn. (Malvaceæ). Algodon, Sp.; Bulac casti- lá, T.; True Cotton.	Luzon and other islands.	do -----	Cloths, etc.; grown specially in Ilocos Norte.
<i>Grewia laevigata</i> Vahl. (Tiliaceæ). Dangli, Danli, T.; Dang- lin, T.	Luzon -----	Inner bark	Twine, cordage, cigar cases.
<i>Grewia multiflora</i> Juss. (Tiliaceæ). Dangli, T.	do -----	do -----	Twine.
<i>Harrisonia benettii</i> A. W. Benn (Simarubaceæ). Bacnit, V.	Panay -----		Hats.
<i>Helicteres</i> sp. (Sterculiaceæ). Baquembaques, Baquin- baquit, Il.	Northern Luzon -----	Inner bark	Twine.
<i>Hibiscus abelmoscus</i> Linn. (Malvaceæ). Castuli, T.	Central Luzon -----	Bark -----	Cordage.

<sup>1</sup> Introduced by the Bureau of Agriculture.

*A list of Philippine fiber plants—Continued.*

Scientific and local or native names.	Distribution.	Part used.	Uses, etc.
<i>Hibiscus tiliaceus</i> Linn. (Malvaceae). Balibago, T, V.; Impid, B.; Malabago, V. Z.; Mali- bago, T.; Malobago, V., Pn.; Malubago, V., P.	Luzon and the Visa- yan Islands.	Inner bark	Cordage, twine, fine tex- tiles, rain coats, cigar cases, etc.
<i>Hibiscus</i> sp. (Malvaceae) Balibago Agpui, B. Albu, B. Batian, B. Catilpue, B. Catipu, B. Cuayan, B. Late, B. Metu, P.; B. Puti, T.; B. Tapitac, P.	Central Luzon	do	Cords, ropes, fine textiles.
<i>Hibiscus</i> sp. (Malvaceae) Ragnivdin, B.	Camarines	do	Hats, mats, pocket cases, baskets, etc.
<i>Hyptis capitata</i> Jacq. (La- biatae). Lingo-lingo.	Southern Luzon		Hats, mats.
<i>Ichnocarpus</i> sp. (Apocyna- ceae). Jipguid, V.	Iloilo		Fish nets.
<i>Kleinhovia hospita</i> Linn. (Ster- culiaceae). Bitnong, Pn.; Tanag, T., P.; Tan-ag, B.	Luzon and the Visa- yan Islands.	Inner bark Fiber ob- tained by maceration.	Cordage, twine, cigar cases, etc.
<i>Litsea</i> sp.? (Lauraceae) Bacau, B.	Camarines		Blankets, and also clothing.
<i>Lygodium</i> sp. (Filices) Agnayas, Hagnayas, Tag- naya, V.	Visayan Islands	Stems	Fish nets and fish corral.
<i>Lygodium scandens</i> (Filices) Nito, Ngito, T.; Climbing Fern.	All islands	Stems and cortex.	Fine hats, mats, cigar cases, etc.
<i>Macaranga</i> sp. (Euphorbia- ceae). Guinabang, T.	Nueva Ecija		
<i>Malachra bracteata</i> , Cav. (Malvaceae). Labog-Labog, V.	Negros Occidental		Roofing.
<i>Melochia arborea</i> Blanco (Sterculiaceae). Balitnong, V.	do	Inner bark	Twine.
<i>Melodorum</i> sp. (Anonaceae) Amuyong, T.	Nueva Ecija	Bark	
<i>Mezocentrum procumbens</i> Blume (Leguminosae). Togabang, V.	Negros Occidental		
<i>Morus alba</i> Linn. (Moraceae) Demoras, V.; Moras, V., T.	Luzon and the Visa- yan Islands.	Stalks	Hats, mats, etc.
<i>Musa paradisiaca</i> Linn. var. (Musaceae). Botohan, B.; Butuhan, T., B.; Banana, Eng.; Plá- tano, Sp.	All islands	Leaf stalks	Hats, mats, cloths called "sinamay."
<i>Musa paradisiaca</i> Linn. var. (Musaceae). Saba, V.; Saba, T.; Bana- na, Eng.; Plátano, Sp.	do	do	Weaving purposes.
<i>Musa paradisiaca</i> <sup>1</sup> Linn. var. (Musaceae). Banana, Eng.; Plátano, Sp.; Tindoc, B., V.; Tun- doc, Z.; Tundugue, V., T.	Luzon and the Visa- yan Islands.	do	Ropes, cordage, etc.
<i>Musa textilis</i> , Nees (Musaceae). Abacá; Manila Hemp, Eng.	All islands	Leaf stalks and sheaths.	Clothing, fish nets, hats, cords, cables, etc.
<i>Musa</i> sp. (Musaceae): Abacá cantong, B.	Albay	do	General uses of Manila hemp; fine white fiber.
Abacá negro, Sp.	Capiz	do	Do.
Abacá nga alamay, M.	Misamis	do	Do.
Abacá nga bicad, M.	do	do	Do.
Abacá nga lamb, M.	do	do	Do.
Abacang puti, V.	Negros Occidental	do	Do.
Agotay, V.	Masbate	do	Do.
Agutay, V.	Romblon	do	Do.
Amucao, Z.	Zambales	do	Do.
Avaja, C.	Agayan	do	Do.
Babaunón, M.	Surigao	do <sup>2</sup>	Do.
Bagacayon, B.	Albay	do	Do.
Binangcayang, T.	Tayabas	do	Do.

<sup>1</sup> This variety produces the well-known "abacá quiltot."<sup>2</sup> 5½ yards long.

*A list of Philippine fiber plants—Continued.*

Scientific and local or native names.	Distribution.	Part used.	Uses, etc.
<b>Musa sp. (Musaceae)—Con.</b>			
Bisaya, V	Negros Occidental	Leaf stalks and sheaths.	Fiber coarse, strong, white, brilliant; yield abundant.
Bognoráron, B.	Albay	do	General uses of Manila hemp.
Bolonganon, V	Negros Occidental	do	Do.
Bo-y, Il	Abra, Union	do	Do.
Cadiznon, V	Negros Occidental	do	Do.
Cagnisan, V	do	do	General use of Manila hemp, especially cloths.
Calibo, B.	Albay	do	General use of Manila hemp.
Camarines, V	do	do	General use of Manila hemp; fiber strong; manipulation easy.
Canalajon, V	Romblon	do	General use of Manila hemp.
Cantong, Pn	Pangasinan	do	Do.
De Pepita, Pn	do	do	Do.
Ebeb, Pn	do	do	Do.
Gutay, V	Romblon	do	Do.
Hajason, V	do	do	Do.
Ilajon, V	do	do	Do.
Inasufre, T	Tayabas	do	Do.
Inisarog, B.	Albay	do	Do.
Isarog or Montes, B	Camarines	do	Do.
Kala-ao, V	Negros Occidental	Sheaths of the leaves.	Do.
Kanaraon, B.	Albay	do	Do.
Kinisol, V	Negros Occidental	do	General use of Manila hemp; manipulation easy.
Lacatan		do	Do.
Lanesid, M	Mindanao	do	General use of Manila hemp, and also cloths.
Lanisid, V., M	Negros Occidental and Surigao.	do	Do.
Lanisip, V	Masbate	do	General use of Manila hemp.
Lanooté, Pn	Pangasinan	do	Do.
Lanot, M	Misamis	do	Do.
Lono, V	Negros Occidental	do	Do.
Mayquidit, B	Camarines	do	Do.
Moro, V	Negros Occidental	do	General use of Manila hemp; manipulation difficult; fiber excellent.
Ozanay, Il	Ilocos Norte	do	Wild banana.
Pakol, V	Southern Luzón and Visayas.	do	Fiber 4 meters long; of little value.
Patungal		do	
Pitogo, V	Bohol	do	
Poonan, M	Surigao	do	
Pliegues or Totoo, V	Romblon	do	
Putian, M	Surigao	do	Cloth and rope making.
Quidit, B.	Camarines	do	
Retondan, V	Bohol	do	
Sabá, T., V., B.	Southern Luzón and Visayas.	do	Cloths called "sinamay."
Sabaon, V	Antique	do	
Salawag, V	Negros Occidental	do	Cordage, etc.
Sanina, B., V	Albay, Masbate, etc	do	
Samoro, V	Visayas	do	
Samorong itom, B	Albay, Camarines	do	
Samorong pula, B	do	do	
Samorong puti, B	do	do	
Samponganan, M	Misamis	do	Ropes, etc.
Sinibuyas, T	Tayabas	do	
Sugutong nga Pacol, V	Capiz	do	
Tabuno, V	Romblon	do	
Tanca-ao, V	Negros Occidental	do	
Tangalan, V	Capiz	do	
Tapaz, V	do	do	
Tinagac, V	do	do	
Tinabuno, V	Negros Occidental	do	
Tinanbuno, V	do	do	
Tomatagakanon, B	Albay	do	
Tood, M	Surigao	do	
Torancog, B	Albay	do	Sinamay.
Tubacanon, V	Capiz	do	
Umambac, V	Negros Occidental	do	
Nipa fruticans Wurm b. (Palmae).	All islands	Leaves	Thatch, etc.
Sasá T.; Nipa, Sp. Octomeles sumatrana Miq. (Datiscaceae).	Nueva Ecija	Bark	
Bilua, T.			

## A list of Philippine fiber plants--Continued.

Scientific and local or native names.	Distribution.	Part used.	Uses, etc.
<i>Oryza sativa</i> Linn. (Gramineæ). Palay, T.; Rice, Eng.	All islands -----	Straw -----	Hats, etc.
<i>Pandanus dubius</i> Spr. (Pandanaceæ). Barew or Bariw, B., V.	Luzon and the Visayan Islands.	Leaves -----	Hats, mats, baskets, pocket cases, bags, sails, etc.
<i>Pandanus sabotan</i> Blanco (Pandanaceæ). Sabotan, T.	Laguna -----	do -----	Mats called "sinabotan" or "sinabatan" and boxes called "tampipi."
<i>Pandanus spiralis</i> Blanco (Pandanaceæ). Pandán, T.; Screw Pine, Eng.	Luzon and other islands.	do -----	Mats, large hats, etc.
<i>Pandanus</i> sp.? (Pandanaceæ) -- Caragamay, Caragomoy, Caragumay, Caragomoy, C.; Karagomoy, B.	Luzon and the Visayan Islands.	do -----	Hats, mats, etc.
<i>Parameria</i> sp. (Apocynaceæ) -- Bulaobulao, V.	Antique, Negros Occidental.		Tying purposes.
<i>Pennisetum</i> sp. (Gramineæ) -- Aguingay, V.	Bohol -----	Stem -----	Hats, etc.
<i>Phaleria</i> sp. (Gramineæ) ----- Salagod, V.	Camarines, Negros Occidental.		Cordage.
<i>Procris erecta</i> Blanco (Urticaceæ). Hanopol, Janapol, T.	Tayabas -----		
<i>Pterocarpus blancoi</i> Merrill (Leguminosæ). Aplit, P.	Pampanga -----	Bark -----	Rope.
<i>Pterospermum diversifolium</i> Blume (Sterculiaceæ). Baroy, Il.; Bayog, V.	Luzon and other islands.	Inner bark ---	
<i>Saccharum spontaneum</i> L. (Gramineæ). Cogon, T.	All islands -----	Stem and leaves.	Hats, thatch.
<i>Sesbania aegyptiaca</i> Pers. (Leguminosæ). Malucadlos, V.	Masbate -----		
<i>Sida carpinifolia</i> Linn. (Malvaceæ). Silhigon, V.	Visayan Islands -----	Leaves -----	Ropes, twine, etc.
<i>Sida frutescens</i> DC. (Malvaceæ). Lalauisin, T.; Taclingvaca, Pn.; Tacquimvaca, Il.; Waliswalisin, P., T.	Luzon Islands -----	Bark -----	Cloths, twine, etc.
<i>Sida indica</i> Blanco. (Malvaceæ). Dalupang, V.	Negros Occidental -----		
<i>Smilax indica</i> Linn. (Liliaceæ). Kamagsa, T.	Laguna -----		
<i>Smilax latifolia</i> Blanco. (Liliaceæ). Sipit-ulang, T.	Nueva Ecija -----	Stems -----	Ropes.
<i>Sterculia foetida</i> Linn. (Sterculiaceæ). Bangar, Il.; Calumpang, P., T.	Luzon and other islands.	Inner bark ---	Do.
<i>Sterculia urens</i> Roxb. (Sterculiaceæ). Banilad, Canilad, V.	Visayan Islands -----	do -----	Twine.
<i>Thespesia camphylsiphon</i> Rolfe (Malvaceæ). Lanutan, V.	Romblon -----		Hats, rain coats.
<i>Thespesia populnea</i> Corr. (Malvaceæ). Bubuy, B., T., V., Il.; Bulacan, V.; Tree Cotton, Eng.	Luzon and the Visayan Islands.	Lint on seed --	Pillows, mattresses, cloths paper, etc.
<i>Typha angustifolia</i> Linn. (Typhaceæ). Balangot, T., V.	Luzon and other islands.	Leaves -----	Twine, hats, etc.
<i>Urena multifida</i> Linn. (Malvaceæ). Colotan, Colot-colotan, Culut-culutan, Molopolo, Dalupan, T., P.	Luzon -----	Bark -----	Ropes, strong fiber.
<i>Zizyphus jujuba</i> Linn. (Rhamnaceæ). Manzanitas, Sp., T., Il.	do -----	do -----	

# A SUPPLEMENTARY LIST OF UNCLASSIFIED PHILIPPINE FIBER PLANTS.

[Alphabetically arranged by their native names by F. Lamson-Scribner, Chief of Insular Bureau of Agriculture.]

Native names.	Distribution.	Part used.	Uses, etc.
Abagon, P	Tarlac		Ropes.
Aga, T	Luzon	Inner bark	Ropes, roofing; apron or breech cloths and sheets of Ibilao and Negritos; fiber obtained by maceration.
Agpui, P	Pampanga	do	Strings for bows.
Ampopoyat, Il	Abra		A vine.
Anito, P	Pampanga		Ropes.
Aramay, Il	Nueva Vizcaya	Bark	Twine, cords, etc.
Arandong, C	Cagayan	do	Textile from the tree called "baliti."
Arivat, Il	Abra		A vine.
Babaian, P	Pampanga	Outer part of stem	Used for wearing apparel.
Babaquet, Il	Abra		A vine.
Bagaas or Baga-as, V	Negros, Panay	Stalks	Hats, mats.
Bagocon, V., B	Visayan Islands	Inner bark	Ropes, twine.
Bagucon, V., B	do	do	Do.
Baito, T., Z	Butuan, Zambales		Hats, "salacots."
Balading, V	Masbate	Leaves, roots	Hats, mats, ropes.
Balanac, T	Nueva Ecija		Strings, etc.; fiber is as strong as piña.
Balbal-liga, Il	Abra		A vine.
Balbas, P	Tarlac		Do.
Balen or Balio, V	Visayan Islands	Leaves	Hats, mats, etc.
Balew, V	Bohol	do	Mats.
Balicnong, V	Antique	Bark	
Baliu, V	Visayan Islands	Leaves	Hats, mats, etc.
Baliwag, T	Bulacan	Stems	Hats; variety of bamboo.
Ballo, V	Negros Occidental	Leaves	Hats, mats.
Balnot, B	Camarines	Inner bark	Ropes; twining plant.
Baloc-Baloc, V	Mindoro		
Balunos, V	Capiz	Stems	Ropes; a vine.
Banacalao, Pn	Pangasinan		Cigar cases.
Bannacalao, Il	Ilocos		Do.
Banitlong, V	Negros Occidental		Ropes.
Baquit, V	Iloilo		Hats.
Barinas, P., T	Tarlac		Ropes, cord.
Barinatnat, Il	Abra		A vine.
Barong, P., T	Tarlac		Ropes, cord.
Batarag, Il., C	Northern Luzon	Stems	Whips, tying bales of tobacco.
Batian, P	Pampanga		Ropes; a vine.
Bical, Il., Pn	Northern Luzon	Stalks	Large hats.
Bicul, Pn	do	do	Do.
Biling, V	Bohol	Bark	Hats, mats.
Bilua, T	Nueva Ecija		Ropes.
Bolongkahinay, V	Occidental Negros	Stems	Cordage; a vine.
Bongbong, V	Bohol	Cortex	Sieves, etc.
Bonot-Bonot, V	Masbate	Bark	Cords.
Bubuyan, P	Pampanga	Palm	Twining.
Bugang, V	Bohol	Bark	Mats, hats.
Bugayon, Il	Abra		A vine.
Bulut Bulutan, P	Pampanga		Ropes.
Cacauon, B	Albay	Inner bark	Do.
Calal-laquiti b a b a l a - quet, Il	Abra		A vine.
Calasias, T	Bataan	Stems	Do.
Camacsá or Camagsá, B., T.	Southern Luzon	do	Fish corrals, lashing timbers, etc.
Camangey, Il	Abra	do	A vine.
Camoras, V	Bohol, Iloilo	Leaves	Hats.
Campapalis, P	Pampanga		Ropes; yields a very fine fiber.
Cana or Cava, T	Cavite	Bark	Ropes, strings.
Canato			Lashing.
Canayan, V	Iloilo	Inner bark	Hats.
Candaba, V	Masbate	Leaves	Shirts.
Capas nga Vayan, Pn	Pangasinan		Species of cotton.
Carome, Pn	do		Large hats.
Carumsi, Il	Ilocos Norte	Stems	Hats, baskets, etc.; a vine.
Catalina, T	Bulacan	Bark	
Ciapo, V	Oriental Negros		Cloths and ropes.
Cilag, Il	Northern Luzon	Leaves and stems.	Mats and hats.
Curipat-tong ti nuang, Il	Abra	Stems	A vine.
Dao, V	Antique	Bark	
Dolocot, V	Iloilo	Stalks	Hats.
Donlareng, Pn	Pangasinan		Cigar cases.
Gubid			Fish corrals.
Guiliman, P	Pampanga	Stems	Ropes, fish nets, and weirs.
			A vine.



*A supplementary list of unclassified Philippine fiber plants—Continued.*

Native names.	Distribution.	Part used.	Uses, etc.
Guilon, V.	Bohol		Hats and mats.
Guiote, Pn	Pangasinan		Species of cotton.
Guni, P	Tarlac	Stems	Ropes; a vine.
Guodeng, Z	Zambales	Bark	Ropes.
Hanadiong or Ilandong, T	Batangas	do	Ropes; fiber obtained by maceration.
Hanagdong, V	Occidental Negros	Inner bark	Twine.
Inillo, V	Antique		Species of cotton; said to be more durable than "bulac."
Jabo?, Z	Zambales	Bark	Ropes; fiber compares favorably with Manila hemp.
Jambabalod, V	Antique	do	
Jory, Pn	Pangasinan	Stems	Binding and lashing; a vine.
Jayud-Bayad, V	Masbate		Hats, mats.
Jinagdong, V	Visayan Islands		Cords, ropes.
Junay, V	Samar		Species of bamboo; very useful.
Kahpok, M	Cottabato	Lint on seed	Wild cotton.
Kauat-Kadlagan, B	Southern Luzon		Cords, ropes.
Labayo, T	Batangas		Ropes.
Labog-Labog, V	Visayan Islands	Bark	Twine; fiber resembles jute.
Lalabang, Il	Nueva Viscaya		Hats, rain coats.
Lang-an, V	Antique	Bark	
Langingi			Cordage.
Langlangsi, Il	Abra	Stem	
Langosig, V	Bohol	Bark	Twine.
Langusig, V	Occidental Negros		Cloths and ropes.
Ligno, B	Albay		Hats, mats.
Lingis, Il	Ilocos Norte	Leaves	Mats; a kind of palm.
Lingi, Z	Zambales		Fine fabrics and cordage; resembles silk.
Lipay, Il	Abra		A vine.
Locmoy or Logmoy, T, V.	Laguna, Mindoro		Binding purposes and basket work.
Lonoc			Cordage.
Lumbay, V	Romblon	Inner bark	Ropes, etc.
Lumpa, V	Antique	Bark	
Lupig, T	Bulacan	do	
Lusuban, Il	Abra	do?	
Maalaases, T	Batangas		Ropes.
Mag-nag, Pn	Pangasinan		A species of cotton.
Mala Achuete or Mala Achote, T.	Luzon		Cordage and ropes.
Malacadios, V	Masbate	Inner bark	Twine.
Malapan, P	Pampanga		Ropes.
Malapao, T	Nueva Ecija	Bark	Cordage.
Malasap, T	Bulacan		do.
Malasapsap, T	Central Luzon		Ropes.
Malasiag, T	Laguna	Bark	do.
Malidlong, V	Oriental Negros	do	Blankets, etc.; a tree called "jalubang."
Malubitis, P	Pampanga		Ropes; yields a fine white fiber.
Malvavisco, T	Batangas		Ropes.
Maragayaman, Il	Union	Stems	Tying purposes.
Maratarong, Il., Pn., T	Central Luzon		Cordage.
Marateca, Il	Union	Inner bark	Tying purposes.
Marotarong, Pn	Pangasinan		Pouches.
Mayambago, M	Surigao	Inner bark	
Metu, P	Pampanga	Stems	Ropes; a vine.
Mulios or Muliot, T	Batangas		Ropes.
Nabo, V	Oriental Negros	Bark	
Nagsungsanga, Il	Abra		A vine.
Ngintu, C	Cagayan		Weaving purposes; a vine.
Oag-oag, Il	Union		Hats.
Oay ni panglao, Il	Abra		A vine.
Ongali, M	Surigao		Tying purposes.
Oplig, Il	Abra		A vine.
Oyagno, B., V	Southern Luzon	Leaves	Hats, mats, baskets, pocket cases, etc.
Paat-haló, V	Occidental Negros	Inner bark	Twine.
Pacacbaquir, Il	Abra	do	Ropes; a tree.
Pacnot, V	Romblon		Ropes, cords.
Pangihan, T, V	Luzon, Bohol, etc	Bark	Ropes; a large tree.
Patangis, V	Masbate	Inner bark	Ropes; a tree.
Poeteg, Pn	Pangasinan	Lint on seed	Cotton.
Popoyoten, Il	Abra		A vine.
Pusapusa, P	Tarlac		do.
Quedding, Il., P., T	Abra, Tarlac	Inner bark	Cordage
Quillo, V	Antique	Lint from seed	Cloths, etc.
Quinio Negro, Z	Zambales	Stems	Fish corrals; a vine.
Rabo de Leon, Il., Pn	Ilocos Norte, Pangasinan.	Leaves	Cloth; fiber resembles Manila hemp.

*A supplementary list of unclassified Philippine fiber plants—Continued.*

Native names.	Distribution.	Part used.	Uses, etc.
Rangrangen, Il.	Abra		A vine.
Roroy, B.	Albay	Leaves	Inferior hats, mats.
Sabid Lucong, Il.	Abra	Vine	
Sabnit, T.	Batangas		Thread.
Sadáo, Il.	Abra	Vine	
Sadiac a juirao, Il.	do	do	
Saguiat, V.	Oriental Negros	Bark	Ropes and cloths.
Sansevieria, V.	Occidental Negros		Textiles and cordage.
Saracay, Il.	Ilocos Norte	Leaves	Hats.
Sayapo, V.	Oriental Negros		Ropes and cloths.
Siapo, V.	Visayan Islands	Inner bark	Ropes.
Siliman, P.	Tarlac	Vine	
Sinaa?, P.	do	do	
Sinaligan, Pn.	Pangasinan		Cigar cases.
Singitan, Il.	Ilocos Sur	Inner bark	Cords, twine, etc.
Sinitu, C.	Agayan		It is braided over a strand of bejuco and used for holding skirts.
Sumaringat, Il.	Abra	Inner bark	Ropes, twine.
Tabong, V.	Capiz		Ropes.
Talibagbangan			Cordage.
Talota, V.	Antique	Bark	
Taluto, T.	Batangas		Do
Tamugui			Cordage.
Tapitac, P.	Pampanga		Do.
Tawtawon, V.	Samar	Bark	
Tayom, V.	Capiz		Hats.
Tayuctayuc, V.	Visayan Islands	Leaves	Hats, mats, etc.
Ticog, M., V.	Luzon, Mindanao, etc.		Mats, pocket cases, etc.
Udin, Il.	Nueva Vizcaya		Salacots, ropes.
Ungale			Cordage.
Variw, V.	Antique		Pocket cases, hats, mats.
Wakal, Pn.	Pangasinan	Stems	Fishing lines; a vine.

*Native names of fiber plants reported to the Bureau of Agriculture by correspondents without further information.*

Agnasag, V.	Camagon, T.	Lucay, V.
Aguingay.	Camcamoras, Il.	Mabago, V.
Alagong, T.	China Cotton, Il.	Malabulac, T.
Alibambang, T.	Cubi, P.	Muda Ticog, V.
Amagon, T.	Culacling, T.	Oclig, Il.
Amuyong, T.	Cuni.	Pana or Bugang.
Balafahu, Il.	Dalag or Dal-lag, Il.	Pangalunachien, Il.
Balangauan, V.	Daldal-Lopang, Il.	Paoí, V.
Balin, V.	Dapig, Il.	Putat, T.
Bannoang, Il.	Daromacá.	Quegded, T.
Baris-an, Il.	Gapas-Gapas, V.	Quernes, T.
Basay, V.	Guinabang, T.	Ragnivdin.
Baud, M.	Hambabago, V.	Sabay-Sabay, V.
Bilibid, V.	Himbabao, T.	Sabutan.
Bitnong, T.	Hinaqui, V.	Sagacap, V.
Bonol, V.	Humay Maya, V.	Salogon, V.
Bubug, C.	Impid.	Sugarap, V.
Bulalat.	Ingual, Pn.	Supig, T.
Bunang-Bunang, V.	Isis, T.	Tagacarao or Taotaohan, V.
Bunutan, Il.	Labing.	Tigbao, V.
Butnong, Il.	Lanutan, T.	Tulongbalite, T.
Cacaoag, Il.	Lipa, T.	Tungu, T.
Cagay, V.	Longtot, Il.	Tutag, Il.
Calios, T.	Lubirin, T.	



## APPENDIX E.

### LIST OF PHILIPPINE WOODS.

Vulgar name.	Scientific name.	Family.	Description and use.
Abilo	<i>Garuga floribunda</i> Decne	Burseraceae	For the construction of shipping stages, temporary bridges, spanning the distance between the wharf and ships; and various other similar uses.
Abutob	<i>Lophopetalum toxicum</i> Loher.	Celastraceae	The bark yields a poison for poisoning arrows.
Acedan	<i>Cryptocarya densiflora</i> Bl	Lauraceae	A very valuable tree and gives logs up to 32 feet long by 28 inches square; dark, dun-red strong, tenacious, durable, and takes good polish; much used for house construction and ship-building, high grade furniture, and excellent charcoal.
Acle	<i>Pithecolobium acle</i> Vidal	Leguminosae	Medium weight, dark ash color, used in construction of city buildings.
Acleng parang	<i>Albizia</i> sp	do	
Agho	<i>Leucaena glauca</i> Benth	do	A small tree or shrub; introduced from Mexico.
	<i>Aglaiia denticulata</i> Turcz	do	
	<i>Aglaiia hexandra</i> Turcz	Meliaceae	
	<i>Aglaiia Ilanosiana</i> C. DC	do	
	<i>Aglaiia macrobotrys</i> Turcz	do	
	<i>Aglaiia Turczaninowii</i> C. DC	Meliceae	A valuable timber tree, used for poles, "horignes," and boards; also used in medicine.
Agoho	<i>Casuarina equisetifolia</i> Forst.	Casuarinaceae	
Agos-os	<i>Ficus pungens</i> Reinw	Moraceae	Occasionally used in house construction.
Aguio	<i>Dysoxylum Blancoi</i> Vidal	Meliaceae	Used to a small extent in the construction of native houses.
Agupanga	<i>Chisocheton</i> sp	do	
Alacap	<i>Palaquium olciferum</i> Blanco.	Sapotaceae	A gutta-percha tree.
Alacac	<i>Palaquium latifolium</i> Blanco.	do	Has sticky, white milk in bark.
Alagao	<i>Premna vestita</i> Schauer	Verbenaceae	Wood, heavy, ashy; commonly used for firewood; fruit valuable; not used in building.
Alahan	<i>Diospyros</i> sp	Ebnaceae	A valuable timber tree; wood heavy, ashy color; used in cabinetwork.
Alalaangat or Baguiro.	<i>Adenanthera pavonina</i> L	Leguminosae	
Alamag	<i>Aporosa</i> sp	Euphorbiaceae	
Alasas	<i>Ficus asperata</i> Blanco.	Moraceae	Firewood chiefly.
Alauhiao	<i>Dracontemelum</i> sp	Anacardiaceae	
Alangbang	<i>Bauhinia malabarica</i> Roxb.	Leguminosae	Firewood.
Alintatao	<i>Chloroxylon Sweitenia</i> DC.	Meliaceae	
Alintatao	<i>Diospyros Philippinensis</i> A. DC.	Ebenaceae	A valuable timber tree; dark, hard wood, like ebony, used in manufacture of furniture.
Almaciga or Antang.	<i>Dipterocarpus</i> sp	Dipterocarpaceae	Wood light, ashy color; gives a valuable gum.
Alipay or Lecheas.	<i>Nephelium glabrum</i> Noronh.	Sapindaceae	Wood heavy, dark gray color; used in house building for posts and for ax handles, etc.
Amact	<i>Xylosma cumingii</i> Clos	Flacourtiaceae	

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Amahil	Eugenia sp.	Myrtaceæ	Use unknown.
	Amoora Cumingiana C. DC.	Meliaceæ	
	Amoora Timorensis W. et Arn.	do	
Ampupuot	Amoora rubiginosa Hiern	do	
	Homalium panayanum F. Vill.	Flacourtiaceæ	
Amugan	Pygeum maingayi Hook	Rosaceæ	
Amuguis	Koordersiodendron pinnatum Merrill.	Anacardiaceæ	A valuable timber tree; wood light red and flesh colored, and sometimes marked with lead-colored spots, with numerous pores of moderate size; is employed in house and ship-building; used for rafters; is subject to attacks of white ants called "anay."
Amuyon	Melodorum fulgens H. f. et Th.	Anonaceæ	A light straw-colored wood; firewood; sometimes used in making panels for doors, etc.
Amuyon	Melodorum latifolium Hook, f. et Th.	do	
Amuyon	Unona discolor Vahl	do	
Anagap	Pithecolobium lobatum Benth.	Leguminosæ	A tree 60 feet high, logs 18 feet long by 16 square; grayish yellow, of fine grain, and somewhat brittle; used for furniture, trimmings, and caskets.
Anahao	Livistona rotundifolia Mart.	Palmeæ	Used for stakes and posts.
Ananapla	Albizia procera Benth	Leguminosæ	A valuable timber tree; construction of edifices and cabinet-work.
Anang	Diospyros sp.	Ebenaceæ	Use unknown.
Aniatan	Ochna fascicularis Blanco	Ochnaceæ	Construction of edifices, high pillars, large bureaus, etc.
Anibong	Areca nibung Mart.	Palmeæ	Not used especially for anything.
Anii	Erythrina ovalifolia Roxb.	Leguminosæ	Ornamental tree; flowers scarlet.
Anilao	Columbia serratifolia DC.	Tiliaceæ	The bark yields a fiber and red dye; wood used as firewood.
Anis cahoy	Myristica philippinensis Warl.	Myristicaceæ	The fruit is a kind of a nutmeg used as condiment.
	Anisoptera tomentosa Brandis.	Dipterocarpaceæ	A valuable timber tree.
	Anisoptera vidaliana Brandis.	do	Do.
Anobling	Talauma Villariana Rolfe	Magnoliaceæ	
Anolang	Poyalthia lanceolata Vidal	Anonaceæ	
Anonang	Cordia blancoi Vidal	Borraginaceæ	Cabinetwork and flooring; black dye from bark.
Anonang	Cordia cumingiana Vidal	do	
Anonas	Anona reticulata L.	Anonaceæ	A tree; fruit edible, medicinal; wood not used.
Anosep	Palaquium cuneatum Vidal	do	A gutta-percha tree.
Ansohan	Stereospermum quadripinnatum F. Vill.	Bignoniaceæ	A valuable timber tree.
Antipolo	Artocarpus incisa L. f.	Moraceæ	A tree of large size; wood grayish yellow to canary and even dark red, sometimes marked with numerous white spots; used for outside planking and keels of vessels, and somewhat for cabinetwork; fruit edible; gum in making bird lime.
Anubing or Anubiong or Anubin.	Artocarpus ovata Tree	do	A tree of moderate size; wood brownish yellow to dark yellow, of fine texture with small pores; used for rafters in native dwellings, also house posts.
Anubling	Talauma angatensis F. Vill.	Magnoliaceæ	
Anuping	Myristica simiarum A. DC.	Myristicaceæ	
Apalong	Osmoxylum pulcherrimum Vidal.	Araliaceæ	
Apiton	Dipterocarpus grandiflorus Blanco.	Dipterocarpaceæ	A most valuable timber tree; very large size; light or dark greenish gray with lighter or even white spots; logs up to 70 feet long by 24 inches square; serves for furniture and general joiners' purposes and in naval construction.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Aragan -----	Homalium -----	Flacourtiaceae	Use unknown.
Arahan -----	Litsea Albayana Vidal -----	Lauraceae	
Aranga -----	Homalium luzoniense F. Vill. -----	Flacourtiaceae	A very large size tree; logs up to 75 feet long by 24 inches square; reddish color with violet stripes; valuable for sea piling, cabinet work, rafters, joists, flooring, and piling.
Aroma -----	Acacia farnesiana Willd -----	Leguminosae	
Aroma -----	Prosopis juliflora DC -----	do	
	Artobotrys cumingianus Vidal -----	Anonaceae	
	Artobotrys rolfei Vidal -----	do	
Asactalong -----	Phyllanthus sp -----	Euphorbiaceae	
Asis or Isis -----	Ficus heterophylla L -----	Moraceae	Mainly used for fuel.
Ates -----	Anona squamosa L -----	Anonaceae	A tree, edible fruit, medicinal.
Aymit or Tibig -----	Ficus glomerata Willd -----	Moraceae	Bark good in dyeing.
Bacan -----	Litsea sp -----	Lamoaceae	Used in building.
Bacauan or Binas -----	Bruguiera canyophylloides Bl. -----	Rhizophoraceae	Firewood; the bark for dyes and tans; wood heavy and red.
Bacauan lalaqui -----	Rhizophora conjugata L -----	do	Used for firewood and the bark for dyes and tanning.
Bagalanguit -----	Palaquium lanceolatum Blanco -----	Sapotaceae	A gutta-percha tree.
Bagalangit -----	Palaquium luzoniense Vidal -----	do	Do.
Bagalugar -----	Melia dubia Cav -----	Meliaceae	
Bagangaso -----	Anaxagorea luzonensis A. Gray -----	Anonaceae	
Bagarilao -----	Anthocephalus cadamba Miq -----	Rubiaceae	
Bagarilao -----	Nauclea sp -----	do	Wood light, dark-red color.
Bagarilao naitim -----	Nauclea purpurea Roxb -----	do	Used in construction of houses.
Bagarilao naitim -----	Terminalia sp -----	Combretaceae	Do.
Bagonite -----	Cupania sp -----	Sapindaceae	
Baguitarim -----	Hopea philippinensis Dyer -----	Dipterocarpaceae	A valuable timber tree.
Bagudilias -----	Buchanania florida Schauer -----	do	
Bahay -----	Ormosia Calavensis Blanco -----	Leguminosae	Wood used for house construction, bark used for cordage.
Bahay -----	Lepidopetalum perrottetii Blume -----	Sapindaceae	Wood medium weight, straw colored; used in house building.
Balacat -----	Zizyphus sp -----	Rhamnaceae	Wood light, straw colored; medium weight, used for ceiling of houses.
Balagan -----	Calophyllum Vidalii F. Vill. -----	Guttiferaceae	A valuable timber tree.
Balao Malapaho or Pano, -----	Dipterocarpus vernicifluus Blanco -----	Dipterocarpaceae	A tree medium to large size, yellowish white or light greenish gray, sometimes with tints of light rose and a yellowish red; used for house building. Its resinous gum fluid and odorous, is employed for varnishing furniture, picture frames, and floors of rooms.
Balaqui -----	Amoora perrottetiana C. DC. -----	Meliaceae	
Balasabis -----	Cupania regularis Bl -----	Sapindaceae	
Balatbat -----	Licuala sp -----	Palmæ	
Balayon -----	Cassia javanica L -----	Leguminosae	
Balete -----	Ficus sp -----	Moraceae	Wood of little value.
Balibago -----	Hibiscus tiliaceus Linn -----	Malvaceae	A light white wood, textile bark used in making rope, etc.
Balie -----	Allophylus cobbe Bl -----	Sapindaceae	
Balictan -----	Cryptocaria villarii Vidal -----	Lauraceae	
Baligango -----	Melia candollei Juss -----	Meliaceae	
Balihod -----	Buchanania florida Schauer -----	Anacardaceae	Used in building, bark yields a dye.
Balinaonao -----	Capura pinnata Blanco -----	Sapindaceae	Used for building and for fuel.
Balingua -----	Evodja triphylla DC -----	Rutaceae	
Balinhasay -----	Buchanania florida Schauer -----	Anacardiaceae	A valuable timber tree; lumber used in making boxes.
Balitbitan -----	Ficus indica Linn -----	Moraceae	
Baliti -----	Ficus parvifolia Miq -----	do	
Baliti -----	Cynometra inaequalifolia A. Gray -----	Leguminosae	Used in building.
Balitnon -----	Melochia arborea Blanco -----	Sterculiaceae	The bark yields a fiber; a small tree.
Ballanballan -----	Leea sp -----	Vitaceae	
Balobo -----	Diplodiscus paniculatus Turcz. -----	Tiliaceae	Cabinet wood.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Baloc	Sapindus sp. Chisocheton paniculatus Hiern.	Sapindaceæ Meliaceæ	
Balocbaloc	Pongamia glabra Vent.	Leguminosæ	A valuable timber tree, used in house building.
Balongcuit	Cedrela Taratará Blanco.	Meliaceæ	A valuable timber tree.
Balon-luyon	Corypha sp.	Palmeæ	
Balsacan	Grewia sp.	Tiliceæ	Use unknown.
Balauan	Macaranga sp.	Euphorbiaceæ	
Balucanag.	Aleurites trisperma Blanco.	do	Yields a valuable oil seed.
Balucot	Garcinia sp.	Guttifereæ	Used for building purposes.
Balungcauayan	Pittosporum floribundum Weta.	Pittosporaceæ	
Balybayan	Pterospermum diversifolium Bl.	Sterculiaceæ	A valuable timber tree.
Banaba	Lagerstroemia speciosa Pers.	Lythraceæ	A valuable timber tree, 30 to 50 feet high; reddish white to dull red; used for ship and house construction, preferably the red variety; is strong and resists the elements well; bark yields black dye.
Banabanalo	Sterculia decandra Blanco.	Sterculiaceæ	Cabinet wood.
Banalo	Cordia subcordata Lam.	Boraginaceæ	
Banato	Mallotus philippinensis Muell. Arg.	Euphorbiaceæ	A small tree; used to some extent in house building.
Banaybanay	Stereospermum banaibanai Rolfe.	Bignoniaceæ	A valuable tree for timber; very heavy wood, grayish brown; used as posts, etc., in light structures.
Bancalauan	Terminalia sp.	Combretaceæ	Very much used in light structure.
Bancudo or Nino.	Morinda citrifolia L.	Rubiaceæ	Yields a dye.
Banga	Calyptracalix spicatus Blume.	Palmeæ	Hardwood palm tree bearing fruit resembling betel nut, but larger; fruit used for making intoxicants; used in framework of native houses.
Bancal or Bangeal.	Sarcocephalus cordatus Miq. (Nauclaea glaberrima DC.).	Rubiaceæ	A tree of large size; logs up to 24 feet long by 16 inches square; golden yellow color or greenish yellow; used in house building and in general joiners' work, but principally for the construction of small canoes, in shipbuilding, and in making barrels, casks, etc.
Banilad	Sterculia urens Rox.	Sterculiaceæ	Bark used for cordage.
Banitan	Cryptocarya luzoniensis Vidal.	Lamaceæ	
Banitan	Xylopia dehiscens Merrill.	Anonaceæ	A valuable timber tree; also used for making canoes.
Banquillin	Phyllanthus distichus Muell. Arg.		
Bansalaqui	Mimusops elengi L.	Sapotaceæ	Cultivated for ornament; wood valuable; used in cabinetwork.
Bansalaguin	Mimusops parviflora Br.	do	Planking, firewood, treenails in shipbuilding, ax and tool handles, belaying pins; excellent for turning purposes.
Bantiqui	Pemphis acidula Forst.	Lythraceæ	A heavy, fine-grained wood.
Banuy	Dipterocarpus sp.	Dipterocarpaceæ.	Wood straw-colored; medium weight.
Banuyo.	Albizia sp.	Leguminosæ	For cabinetwork.
Barongoy.	Orania regalis Zipp.	Palmeæ	Wood very heavy.
Barit or Palo de heirro.	Metrosideros vera Rumph.	Myrtaceæ	
	Barringtonia luzonensis Vidal.	Leceythydaceæ.	
Basilay	Ochna squarrosa Lim.	Ochnaceæ	
Batete	Wrightia sp.	Apocnaceæ	
Batican	Dracontomelum sp.	Anacardiaceæ.	
Baticuclin	Litsea perrottetii F. Vill.	Lauraceæ	Used in carving and sculpture.
Baticucling	Litsea magnifica B. et H.	do	
Baticucling or Marung.	Litsea magnifica B. et H.	do	For wood carving and sculpture.
Batindalaga	Pithecolobium lobatum Benth.	Leguminosæ	Used in building.
Batino	Alstonia macrophylla Wall.	Apocnaceæ	For house building, shipbuilding and cooerage.
Batino	Dipterocarpus sp.	Dipterocarpaceæ.	A large tree with straw-colored wood, medium weight; used in house building.
Batiti or Dila dila	Cynometra inequalifolia A. Gray.	Leguminosæ	Tree yielding gum of little value.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Batitanan	Lagerstroemia Batitanan Vidal.	Lythraceae	A valuable timber tree, first-class wood, large size; logs up to 40 feet long by 18 inches square, ashy red to intense olive-brown color; strong, tough, and elastic; used for ship planking above water and for furniture, being much stronger than teak and advantageously replacing it.
Batoan	Dracontomelum sp.	Anacardiaceae	
Batobato	Litsea sp.	Lauraceae	
Batobato	Litsea villosa Bl.	do	Used in building light structures.
	Bauhinia variegate L.	Leguminosae	
Bayabas	Psidium guayaba Linn.	Myrtaceae	Edible fruit, guava; wood used for fuel and char oal; introduced from Mexico.
Bayacud	Voacanga sp.	Apocynaceae	
Bayoc	Pterospermum acerifolium Willd.	Sterculiaceae	A valuable timber tree; used for making oars and boats, etc.
Bayoc-tingan	Pterospermum blumeianum Korth.	do	Use unknown.
Bayucan	Dipterocarpus	Dipterocarpaceae	Heavy wood, similar in appearance to maple; suitable for building.
Bayuco	Artocarpus nitida Tree	Moraceae	
Bayung	Perospermum diversifolium Willd.	Sterculiaceae	A grayish yellow wood; medium weight; used for oars and paddles; also for fuel.
Betis	Illipe betis Merrill	Sapotaceae	A large tree giving logs up to 65 feet long by 20 inches square, brownish red or light red; used for building keels for vessels, also for fresh-water piling, piers, wharves, etc.
Bigaa	Ficus sp.	Moraceae	
Biga	Zizyphus sp.	Rhamnaceae	Used for flooring in houses.
Bignay	Antidesma bunius Spreng.	Euphorbiaceae	Used as stakes by natives in fencing, for firewood, and charcoal.
Bignay	Phaenthus cumingii Miq.	Anonaceae	A small tree with soft wood.
Bignay Pogo	Antidesma ghaesembilla Gaertn.	Euphorbiaceae	A small tree with heavy, reddish wood.
Bilaun	Macaranga mappa Muell. Arg.	do	Used for making small bancas.
Bilolo	Eugenia sp.	Myrtaceae	
Bilucuo	Garcinia cambogia Desrous.	Guttiferae	The source of a valuable gum—"gamboge."
Binaguan	Dipterocarpus affinis Brandis.	do	A valuable timber tree.
Binayuyu	Antidesma Cumingii Muell. Arg.	Guttiferae	Used in light structure.
Binouang	Ocoteles sumatrana Miq.	Datiaceae	Used in making small bancas.
Binting Dalaga	Micromelum tephrocarpum Turcz.	Rutaceae	A small tree.
Bintoco	Evodia latifolia DC.	do	
Binunga	Macaranga tanarius Muell. Arg.	Euphorbiaceae	With reddish wood, medium weight, used for fuel.
Birlag	Elaeocarpus cumingii Turcz.	Elaeocarpaceae	
Bitanhol	Flacourtia cataphracta Roxb.	Flacourtiaceae	
Bitanhol or Bitanjol.			See Palo Maria.
Bitlag	Chailletia gelonioides H. F.	Dichapetalaceae	
Bitoc or Bitanhol	Calophyllum spectabile Willd.	Guttiferae	A valuable timber tree, used for planks, rafters, and posts.
Bitungol	Scolopa crenata Clos.	Flacourtiaceae	
Bogo	Garuga sp.	Burseraceae	
Balete	Ficus clusioides Miq.	Moraceae	
Balongita or Balongeta.	Diospyros pilosanthera Blanco.	Ebenaceae	A tree with wood of a light-red color or dark red, with streaks and spots of black; very useful for building and cabinetwork.
Bonga	Areca catechu L.	Palmae	The betel-nut palm; used for flooring and framework in houses; the nut chewed with lime and leaves of Piper betle.
Botong	Barringtonia speciosa Forst.	Leechthidaceae	A tree with large pink flowers and large fruit.
Bubuy or Bulac	Ceiba pentanda Gaertn.	Malvaceae	A small tree, the fruit yielding the "kopak" fiber of commerce.
	Buchanania microphylla Engl.	Anacardiaceae	



## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Bugo	<i>Dracontomelum</i> sp.	Anacardiaceæ	Use unknown.
Bulagac	<i>Uvaria ovalifolia</i> Blume	Anonaceæ	
Bulaleng	<i>Pittosporum brachysepalum</i> Turcz.	Pittosporiaceæ	
Bulwong	<i>Dysoxylum</i> sp.	Meliaceæ	Do.
Bungalon	<i>Avicennia officinalis</i> L.	Verbenaceæ	For building and firewood; heartwood yields black dye.
Bunglas	<i>Zizyphus</i> sp.	Rhamnaceæ	
Bunglis	<i>Eugenia</i> sp.	Myrtaceæ	Use unknown.
Busilac	<i>Amoora canarana</i> Hiern		
Butobato	<i>Cerbera odollam</i> Gaertn.	Apocynaceæ	
Butong manoc	Indetermined		Used in building; bark contains a small amount of red dye.
Caba	<i>Fagraea</i> sp.	Loganiaceæ	A tree with light, whitish wood.
Cabatiti	<i>Rhamnus wightii</i> W. et A.	Rhamnaceæ	
Cabuyao	<i>Citrus hystrix</i> DC.	Rutaceæ	A heavy white wood, used for making canes.
Cacana	<i>Quercus campanoana</i> Vidal.	Fagaceæ	
Cacana or Olayan	<i>Quercus soleriana</i> Vidal.	do	
Cacaucauan	<i>Talauma</i> sp.	Magnoliaceæ	
Cagatigan	<i>Pygeum parviflorum</i> Teys. et Binn.	Rosaceæ	
Cairocan	<i>Bettschmeidia cariocan</i> Vid.	Lauraceæ	
Calachuchi	<i>Plumeria acutifolia</i> Poir.	Apocynaceæ	An ornamental tree with fragrant flowers.
Calamansanay	<i>Terminalia calamansanay</i> Rolfe.	Combretaceæ	For naval and house construction, flooring, and furniture.
Calanigi	<i>Gordonia</i> sp.	Fernstroemia- ceæ.	Use unknown.
Calanag	<i>Ailanthus malabarica</i> DC.	Simarubaceæ	
Calantas or Philippine Cedar.	<i>Cedrela toona</i> Roxb.	Meliaceæ	A valuable lumber tree giving logs up to 40 feet long by 35 inches square; flesh color, brick red and in some varieties a pale ashy red; used chiefly for the manufacture of cigar boxes and makes handsome inside fittings.
Calapia	<i>Palaquium aherianum</i> Merrill.	Sapotaceæ	A gutta-percha tree.
Calapia	<i>Palaquium celebicum</i> Buack	do	Do.
Calay	<i>Xylopia</i> sp.	Anonaceæ	
Calay	<i>Monodora myristica</i> Blanco.	Anonaceæ	
Caliantang	<i>Lecyda sambucina</i> Blanco.	Vitaceæ	A small tree.
Calibyoan or Baio	<i>Bruguiera eriopetala</i> W. et Arn.	Rhizophoraceæ	Firewood.
Calimanlao	<i>Diospyros</i> sp.	Ebenaceæ	A tree with light yellowish-white wood.
Calimantao	<i>Eyodia</i> sp.	Rutaceæ	Used for panels of doors, planking, etc.
Calingaga	<i>Cinnamomum mercadoi</i> Vidal.	Lauraceæ	Medicinal bark.
Calios	<i>Streblus asper</i> Lour.	Moraceæ	A small tree; used in fencing fields and gardens.
Calobcub	<i>Eugenia macrocarpa</i> Rob.	Myrtaceæ	A tree with heavy wood, dark brown to black color.
Calomala	<i>Eleocharpus lanceifolius</i> Roxb.	Eleocharpaeæ	
	<i>Calophyllum amplexicaule</i> Choisy.	Guttiferæ	A valuable timber tree.
	<i>Calophyllum buxifolium</i> Vesque.	do	
	<i>Calophyllum cumingii</i> Pl. and Tr.	do	Do.
	<i>Calophyllum pseudotacamahaca</i> Pl. and Tr.	do	Do.
Calumanog	<i>Terminalia</i> sp.	Combretaceæ	For building and cabinetwork; bark yields black dye.
Calumpang	<i>Stereulia foetida</i> L.	Stereuliaceæ	A tree of very great size; wood brownish-yellow color; easy to work, but not lasting; used for boards and bancas; yields a valuable oil seed.
Calumpit	<i>Terminalia edulis</i> Blanco.	Combretaceæ	A tree of moderate size; wood dull yellowish color, with ashy spots, or of a uniform ash color; ripe fruit is edible; used in some places for dyeing cotton; of dirty straw color; also lumber used in house building, for rafters, pillars, etc.
Camanchile	<i>Pithecolobium dulce</i> Benth.	Leguminosæ	Edible fruit; bark used for tanning, wood for making charcoal; introduced from Mexico.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Camangsi or Daluguan.	Artocarpus camansi Blanco	Moraceæ	Used in house construction.
Camanguianis	Clausena excavata Burm.	Rutaceæ	
Camantayo	Cratoxylon formosum Dyer.	Guttifereæ	
Camaynan	Gmynosporia sp.	Celentraceæ	
Camigay	Cryptocarya Ilocana Vidal.	Lauraceæ	
Camuning	Murraya exotica	Rutaceæ	A tree 12 to 15 feet high; wood bright ocher color, uniform or with wavy streaks and spots of brown; used chiefly for cabinet-work; the Moros use it in making handles for their weapons; takes a good polish.
Canafistula	Cassia fistula L.	Leguminosæ	A tree with medium wood white or light reddish in color, fruit used in medicine.
Canamay	Canarium gracile Engl.	Burseraceæ	A valuable timber tree.
	Diospyros multiflora Blanco.	Ebenaceæ	
Cansuyot	Aporosa sp.	Euphorbiaceæ	Use unknown.
Caraol	Acacia sp.	Leguminosæ	
Carisquis	Albizzia julibissin Durazz.	do	
Carocap	Eugenia sp.	Myrtaceæ	
Caropsan	Linociera luzonica F. Vill.	Oleaceæ	
Casoy	Dysoxylum sp.	Meliaceæ	A valuable fruit and oil seed, introduced from Mexico.
Casoy	Anacardium occidentale L.	Anacardiaceæ	
Catmon	Dillenia Philippinensis Rolfe.	Dilleniaceæ	A valuable timber tree; used for house planking.
Catmon	Dillenia speciosa Gilg.		Use unknown.
Caturay	Sesbania grandiflora Rers.	Leguminosæ	Wood soft, white; of little value.
Cauon	Arenga saccharifera Lab.	Palmeæ	
Cayantol	Linociera	do	A heavy wood, grayish white.
Chapaca	Michelia champaca Linn.	Magnoliaceæ	The flower of this species yields a valuable perfume.
Chico	Acharas sapota Linn.	Sapotaceæ	A valuable fruit tree, introduced from America.
Chico mamey	Lucuma mamosa Gaertn.	do	Do.
	Chrysophyllum grandifolium Steud.	do	
Cinamomo	Aglaia odorata Lour.	Meliaceæ	A valuable ornamental tree with odorous flowers.
Coliat	Cleistanthus eupreus Vid.	Euphorbiaceæ	A valuable timber tree.
	Gnetum latifolium Blume.	Gnetaceæ	
Camagon	Diospyros discolor Willd.	Ebenaceæ	A valuable lumber tree, black with yellowish-red or narrow brown streaks and sometimes with black spots; takes a good polish; does not curl; highly valued for cabinetwork, and often confounded with ebony; has an edible fruit.
Conacon	Elaeocarpus floribundus Bl.	Elaeocarpaceæ	A tree with yellowish-brown wood with greenish spots; used in building, chiefly in joiner's work; also used for posts.
Cubi	Artocarpus	Moraceæ	
Cubili	Cubilia rhumphii Bl.	Sapindaceæ	In construction of houses.
Culilisiao	Linociera cumingiana Vid.	Oleaceæ	
Culing Manoc	Cathium	Rubiaceæ	
Culis	Memecylon edule Roxb.	Melastomaceæ	A tree with wood rosy white to brick red, sometimes with streaks and spots of lighter color; good for building purposes, although not in common use; somewhat used for cabinetwork.
Cunalong	Diospyros cunalong A. DC.	Ebenaceæ	A tree with heavy grayish-yellow wood; used in making agricultural implements, such as plows, etc.; leaves used for dyeing.
Cupang	Parkia roxburghii G. Don.	Leguminosæ	A valuable timber tree.
Cuyaquia	Pometia sp.	Sapindaceæ	A large tree with light reddish-brown color; wood used in making cascoes, also for fuel.
	Taxatrophis ilicifolia Vie-tol.	Moraceæ	
Cuyos cuys	Cynometra acutiflora L.	Leguminosæ	do
	Cynometra simplicifolia Harms.	do	
	Cynometra warburghii Harms.	do	

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Dale	<i>Terminalis</i> sp	Combretaceæ	Wood reddish-brown; medium weight.
Dalindigan	<i>Shorea</i> sp	Dipterocarpaceæ	A valuable timber tree; used for construction of edifices.
Dalinsi	<i>Terminalia</i> sp	Combretaceæ	Used in naval and house construction.
Dalanta	<i>Zizyphus dalanta</i> Blanco	Rhamnaceæ	
Dalomot	<i>Pipturus asper</i> Wedd.	Urticaceæ	
Daluroy	<i>Aglaiia argentea</i> Bl	Meliaceæ	
Danguy or Bangay.	<i>Grewia</i> sp	Tiliaceæ	Used in building light structures.
Danglin	<i>Grewia leavigata</i> Vahl	do	
Dangon or Dangling.	<i>Dipterocarpus</i> sp	Dipterocarpaceæ	Wood grayish-yellow; medium weight.
Dangoy	<i>Grewia tiliacifolia</i> Vahl	Tiliaceæ	
Danlig	<i>Shorea squamata</i> B. and H. f.	Dipterocarpaceæ	A valuable timber tree.
Danloy	<i>Grewia umbellata</i> Roxb.	Tiliaceæ	
Dao	<i>Dracontomelum</i> sp	Anacardiaceæ	Wood light, dark, grayish, used for canoes and building.
Dapdap	<i>Erythrina indica</i> L.	Leguminosæ	A valuable tree for ornamental purposes; flowers red; used by natives in making shields.
Dapdap	<i>Erythrina lithosperma</i> Bl	Leguminosæ	Very similar to <i>Erythrina indica</i> .
Daraya	<i>Cratoxylon polyanthum</i> Korth.	Guttiferæ	
	<i>Dasycoleum cumingianum</i> C. DC.	Meliaceæ	
	<i>Dasycoleum philippinum</i> Turcz.	do	
Dayaca	<i>Wallichia tremula</i> Mart	Palmeæ	
Diladila	<i>Excoecaria</i> sp	Euphorbiaceæ	
Dilan usa	<i>Carallia intergerrima</i>	Rhizophoraceæ	A small tree.
Dilang butiqui	<i>Podocarpus</i> sp	Conifereæ	Wood light gray, medium weight; for cabinetwork.
Dinglas	<i>Eugenia</i> sp	Myrtaceæ	A tree giving logs up to 40 feet long by 16 feet square; brownish or ashy red; very durable; employed in the construction of buildings and ships.
	<i>Diplophraetum philippinense</i> Vidal.	Tiliaceæ	
	<i>Dipterocarpus speciosus</i> Brandis.	Dipterocarpaceæ	A valuable timber tree.
	<i>Dipterocarpus velutinus</i> Vidal.	do	Do.
Ditaa	<i>Alstonia scholaris</i> R. Br.	Apocynaceæ	Wood grayish yellow, medium weight; bark used as a substitute for quinine, wood for furniture, musical instruments, troughs, etc.
Ditadita	<i>Alstonia pulchra</i> Vidal.	Melastomaceæ	
Dolitan	<i>Palaquium</i> sp	Sapotaceæ	A gutta-percha tree.
Dolitanpula	<i>Sideroxylon parvifolium</i> F. Vill.	do	The lumber is used in building small boats.
Doliatan-Puti	<i>Garcinia</i> sp	Guttiferæ	Heavy grayish-yellow lumber; used in building.
	<i>Dryobanolops aromatica</i> Gaertn.	Dipterocarpaceæ	A valuable timber tree.
Duca	<i>Ditellasma rarak</i> Benth. et Hook.	Sapindaceæ	
Duelap	<i>Zizyphus trinervis</i> Poir.	Rhamnaceæ	Do.
Duelitan	<i>Sideroxylon Duclitan</i> Blanco.	Sapotaceæ	Bark is used as cordage.
Duguan	<i>Myristica guatteriaefolia</i> A. DC.	Myristicaceæ	Used in building; sap used for varnish.
Duguan	<i>Myristica cumingii</i> Warb.	do	
Duhao	<i>Myristica mindanensis</i> Warb.	do	
Dumayaca	<i>Caryota tremula</i> Blanco	Palmeæ	
Dumgarug	<i>Ficus cuneat</i> Miq	Moraceæ	
Dungon or Dongon.	<i>Heritiera sylvatica</i> Merrill.	Sterculiaceæ	A very valuable timber tree; logs 50 feet long by 20 inches square; pale reddish; used for roof timber and for keels of vessels; strong but does not resist the attack of the seaworm.
Dungon, late	<i>Heritiera littoralis</i> Dryand.	do	A valuable timber tree, found along the seashores.
Dulitan-pula	<i>Palaquium luzonensis</i> Vidal.	Sapotaceæ	For roof beams and house construction and boards for construction of small boats.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Dulitan	<i>Palaquium luzonensis</i> Vidal.	Sapotaceæ	For roof beams and house construction and boards for construction of small boats.
	<i>Dysoxylum cumingianum</i> C. DC.	Meliaceæ	
	<i>Dysoxylum schizochitoides</i> DC.	do	
	<i>Dysoxylum turczaniowii</i> C. DC.	do	
Ebano or Ebony or Luyong.	<i>Maba buxifolia</i> Pers.	Ebenaceæ	A very valuable timber tree; differs from camagon in its more intense and uniform black color without brown or yellow streaks; very valuable for cabinetwork and also employed in making gunpowder.
	<i>Elaeocarpus oblongus</i> Gaertn.	Flacourtiaceæ	
	<i>Eriobotrya philippinensis</i> Vidal.	Rosaceæ	
	<i>Eugenia cumingiana</i> Vidal.	Myrtaceæ	
	<i>Evodia glabra</i> Bl.	Rutaceæ	
	<i>Ficus gelderi</i> Miq.	Moraceæ	
	<i>Ficus infectoria</i> Roxb.	do	
	<i>Ficus disticha</i> Blume.	do	
	<i>Ficus quercifolia</i> Roxb.	do	
	<i>Ficus callosa</i> Willd.	do	
	<i>Ficus nuda</i> Miq.	do	
	<i>Ficus conocarpa</i> Miq.	do	
	<i>Ficus celebica</i> Blume.	do	
	<i>Ficus altissima</i> Blume.	do	
	<i>Ficus macropoda</i> Miq.	do	
	<i>Ficus pendunculosa</i> Miq.	do	
	<i>Ficus pisifera</i> Wall.	do	
	<i>Ficus pruniformis</i> Blume.	do	Like most species of genus, this species yields the gum known as "balete."
	<i>Ficus retusa</i> L.	do	
	<i>Ficus ribes</i> Reinev.	do	
	<i>Ficus subulata</i> Blume.	do	
Galagala	<i>Flacourtia lanceolata</i> Clos.	Flacourtiaceæ	The source of the gum known as dammer.
	<i>Agathis loranthifolia</i> Salisb.	Conifereæ	
Gala-gala	<i>Agathis philippinensis</i> Warb.	do	Do.
Gatasan	<i>Garcinia cornea</i> L.	Guttifereæ	Used in building.
Gatasan pula	<i>Garcinia venulsa</i> Choisy.	do	The source of a valuable gum.
	<i>Garcinia bosobosensis</i> Pierre.	do	
	<i>Garcinia cumingiana</i> Pierre.	do	
	<i>Garcinia andersonii</i> Hook. f.	do	
	<i>Garcinia morella</i> Desv.	do	
	<i>Gardenia longiflora</i> Vidal.	Rubiaceæ	
	<i>Geunsia cumingiana</i> Rolfe.	Verbenaceæ	
	<i>Gnetum philippinensis</i> Warb.	Gnetaceæ	
Goyongoyon	<i>Cratoxylon micradenium</i> Turcz.	Guttifereæ	Firewood.
	<i>Grewia eriopoda</i> Turcz.	Tiliaceæ	
Juss	<i>Grewia multiflora</i>	do	A tree; medicinal fruit edible; introduced from America.
Guanabano	<i>Anona muricata</i>	Anonaceæ	
Guijo or Guiso or or Guisoc.	<i>Shorea guiso</i> Vidal.	Dipterocarpaceæ.	A valuable timber tree, logs up to 75 feet long by 24 inches square; light red to dark red; very durable, strong, tough, and elastic; in Manila used for carriage shafts, in Hongkong for wharfs, decks, and flooring.
Guisihan	<i>Ratonia montana</i> Benth. et Hook.	Sapindaceæ	Firewood.
Guyon-guyon	<i>Cratoxylon floribundum</i> F. Villar.	Guttifereæ	
	<i>Gymnacranthera paniculata</i> Warb.	Myristicaceæ	
	<i>Gymnacranthera sulensis</i> Warb.	do	
Hagache	<i>Dipterocarpus filiosus</i> Roxb.	Dipterocarpaceæ.	Used in naval construction.
Hagadad	<i>Dipterocarpus</i> sp.	do	A valuable timber tree.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Haguimit	<i>Ficus hederacea</i> Roxb	Moraceæ	A tree with heavy red wood. The source of a valuable gum.
Helentihinao	<i>Astronia cumingiana</i> Vid.	Melastomaceæ	
Halupag	<i>Nephelium</i>	Sapindaceæ	
Haras	<i>Garcinia cowa</i> Roxb	Guttifereæ	
Hauli	<i>Ficus subracemosa</i> Bl	Moraceæ	
	<i>Hearnia cumingiana</i> C. DC.	Meliaceæ	Used for flooring.
	<i>Heynea trijuga</i> Roxb	do	
Kimbabao	<i>Allantherus luzonicus</i>	Moraceæ	
	F. Vill.		
Himbabao	<i>Excoecaria agalocha</i>	Euphorbiaceæ	
	Muell. Arg.		Ornamental tree; introduced from Mexico.
Himulao	<i>Clausena wildenovii</i> W.	Rutaceæ	
	et A.		
Hoja cruz	<i>Crescentia alata</i> H. B. et K.	Bignoniaceæ	
	<i>Homalium barandae</i> Vid.	Flacourtiaceæ	
	<i>Homalium feoditum</i> Benth.	do	For building purposes.
Hongo	<i>Elaeocarpus</i> sp	Elaeocarpaceæ	
	<i>Horsfieldia ardisifolia</i> Warb.	Myristicaceæ	A medicinal tree.
Dang-ilang Sonson	<i>Artabotrys odoratissimus</i>	Anonaceæ	
	R. Br.		A tree with white wood, does not last well, and subject to the attacks of insects; the flowers of this species yield a valuable perfume.
Dang-ilang	<i>Cananga odorata</i> H. f. et Th.	do	
	<i>Ilex cumingiana</i> Rolfe	Aquifoliaceæ	
	<i>Ilex luzonica</i> Rolfe	do	
	<i>Ilex philippinensis</i> Rolfe	do	A valuable timber tree. Do.
	<i>Ixora cumingiana</i> Vid.	Rubiaceæ	
	<i>Knema heterophylla</i> Warb.	Myristicaceæ	
	<i>Knema stenocarpa</i>	do	
	<i>Knema vidalii</i> Warl.	do	
	<i>Kurrimia gracilis</i> Vidal	Celastraceæ	Do.
	<i>Kurrimia luzonica</i> Vidal	do	
Ladeo	<i>Wendlandia luzoniensis</i>	Rubiaceæ	
	DC.		
	<i>Lagerstroemia calycina</i>	Lythraceæ	
	Koehne.		A valuable timber tree, wood white, used for cabinet work, carving, etc., musical instru- ments, decorations, and turn- ing.
	<i>Lagerstroemia pirifomis</i>	do	
	Koehne.		
Lagnig	<i>Clausena</i> sp	Rutaceæ	
Iagnob	<i>Ficus leucopleura</i> Bl	Moraceæ	
Lamio	<i>Dracontomelum mangiferum</i> Bl.	Anacardiaceæ	A valuable timber tree, wood white, used for cabinet work, carving, etc., musical instru- ments, decorations, and turn- ing.
Lanete or Lanite	<i>Wrightia ovata</i> A. DC	Apocynaceæ	
Langaray	<i>Bruguiera parviflora</i> W. et Arn.	Rhizophoraceæ	
Langil	<i>Albizia saponaria</i> Blume	Leguminosæ	A valuable timber tree.
Langil	<i>Albizia retusa</i> Benth.	do	
Languil	<i>Albizia lebbek</i> Benth.	do	
Langingling	<i>Ficus cumingii</i> Miq.	Moraceæ	
Lanotan	<i>Goniothalamus malayanus</i>	Anonaceæ	
	H. f. et Th.		Do. For making wide boards, for paddles and oars.
Lanutan	<i>Sacopetalum longipes</i> Vid.	do	
	<i>Thespesia campylosiphon</i>	Malvaceæ	
	Rolfe.		
Lanutanitim	<i>Phacanthus nutans</i> H. f. et Th.	Anonaceæ	
			A valuable timber tree; used in the construction of canoes, shipbuilding, houses, etc.
Lanutanputi	<i>Goniothalamus giganteus</i>	do	
	H. f. et Th.		
Lasgas	<i>Villaria philippinensis</i> Rolfe.	Rubiaceæ	
Lauan, Lauan, or Sandana.	<i>Anisoptera thurifera</i> Blanco.	Dipterocarpaceæ	
			Used in building.
Libas	<i>Eugenia</i> sp	Myrtaceæ	
Libas-libas	<i>Symplocos</i> sp	Leguminosæ	
Liboto	<i>Lumtzeria purpurea</i>	Combretaceæ	
Libatoputi	<i>Cumingia philippinensis</i> Vidal.	Malvaceæ	
			Wood heavy, reddish gray. Used in construction of buildings.
Liga	<i>Semecarpus</i>	Anacardaceæ	
Ligaa	<i>Zizyphus arborea</i> Merrill	Rhamnaceæ	
Ligas	<i>Semecarpus perrottetii</i>		
Liosin gutat	<i>Pygeum</i> sp	Rosaceæ	
Lipote	<i>Eugenia</i> sp	Myrtaceæ	Tree with heavy white wood; used in building; for house posts, etc.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Lisac -----	Nauclea cumingiana Rolfe	Rubiaceae -----	Use unknown.
Lita -----	Voacanga cumingiana Rolfe.	Apocynaceae -----	
	Litsea cinnamoma Bl -----	Lauraceae -----	
	Litsea fulva F. Vill. -----	do -----	
	Litsea verticillata Vidal -----	do -----	
	Litsea villosa Blume -----	do -----	Wood grayish yellow, light weight; used in building.
Loetob -----	Ficus laurifolia Blanco.	Moraceae -----	
Loeton -----	Duabanga moluccana Bl	Blattiaceae -----	
Loloy -----	Artocarpus odoratissima Blanco.	Moraceae -----	
Lubi-lubi -----	Buchanania nitida Engl	Anacardiaceae -----	
Lingo lingo -----	Indetermined		Use unknown.
Linsin -----	do		Used in making keels of vessels.
Lucbangubat -----	Citrus sp.	Rutaceae -----	Yields a valuable oil seed.
Lumbang -----	Aleurites moluccana Willd.	Euphorbiaceae -----	
Lumbiac -----	Iguanura sp.	Palmae -----	
Lumboy or Duhat -----	Eugenia jambolona Lam	Myrtaceae -----	
Lunas -----	Lunasia amara Blanco	Rutaceae -----	
Lunas -----	Lunasia parvifolia F. Vill	do -----	Edible fruit.
Lunas naitim -----	Gonocaryum tarlacense Vid.	Icacinaceae -----	
Luyos -----	Arcea sp.	Palmae -----	
Macaasin -----	Eugenia -----	Myrtaceae -----	
			Two varieties, the red and white; former is used for shipbuilding, latter for inside housework and flooring.
Macaasin -----	Eugenia sp.	do -----	For building and cabinetwork.
Macaasimpula -----	Eugenia leptantha Wight	do -----	Do.
Macabingao -----	Quercus lanos DC	Cupuliferae -----	Used in housebuilding.
Macasilad -----	Licuala elegans Mart.	Palmae -----	
Macaturay -----	Stereospermum sp.	Bignoniaceae -----	
Macupa -----	Eugenia -----	do -----	
Madre cacao -----	Gliricidia maculata H. B. et K.	Leguminosae -----	
Magabagaba -----	Arytera refescens Radk	Sapindaceae -----	Used in construction of houses, etc.
Magabayo -----	Celtis philippensis Blanco.	Nemaceae -----	Use unknown.
Magaon -----	Kayaea gurdiae Vesque	Guttiferae -----	A valuable timber tree.
Magaramnula -----	Careya -----	Lecythidaceae -----	Wood grayish yellow; heavy weight.
			Used in construction of edifices.
Magarambulo -----	Cyclostemon sp.	Euphorbiaceae -----	Used in building.
Magarapale -----	Terminalia -----	Combretaceae -----	
Magarilao -----	Nauclea sp	Rubiaceae -----	
Maguilic -----	Litsea sp	Laureaceae -----	
Malaanuang -----	Shorea malaanonan Blume.	Dipterocarpaceae -----	
			A tree with light wood, yellowish gray; used in naval construction.
Mala arnangan -----	Homalium villarianum Vidal.	Flacourtiaceae -----	Use unknown.
Malabago -----	Hibiscus tiliaceus L	Nalvaceae -----	A tree with very heavy leaves; fruit edible.
Malabaguio -----	Olax imbricata Roxl	Olacaceae -----	
Malabalubat -----	Semecarpus gigantifolia Vidal.	Anacardiaceae -----	
Malabaya -----	Chisocheton tetrapetalus Turcz.	Meliaceae -----	
Malabig -----	Eugenia -----	Myrtaceae -----	
Malabayabas -----	do	do -----	Used in building houses.
Malabayabas -----	Gardenia oscura Vid	Rubiaceae -----	
Malabochoe -----	Mesua ferrea Lim	Guttiferae -----	
Malabonga -----	Itea daphanecconfusa Blume.	Lauraceae -----	
Malabonot -----	Sterculia stipularis R. Br	Sterculiaceae -----	
Malabulac -----	Bombax malabaricum	Malvaceae -----	Used in building.
Malacados -----	Myristica sp.	Myristicaceae -----	
Malacadius -----	Litsea Chinensis Lam	Lauraceae -----	
Malacacao -----	Sterculia sp	Sterculiaceae -----	
Malacalios -----	Elaeocarpus monocera	Elaeocarpaceae -----	
Malacamote -----	Aglaiia -----	Meliaceae -----	A tree with very heavy wood, reddish brown in color; boards used for flooring.
Malacamote -----	Beddomia luzonensis Vidal	do -----	Used for finishing ceilings and other inside work.
Malacauayan -----	Hemigyroa deficiens	Sapindaceae -----	A valuable timber tree.
Malacdog -----	Combretum acuminatum Roxb.	Combretaceae -----	
Malaciac -----	Clethra canescen Reinw	Clethraceae -----	
Malagunisan -----	Kayaea philippinensis Planch.	Guttiferae -----	
Malaiba -----	Phyllanthus sp	Euphorbiaceae -----	
			A small tree with light whitish wood.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Malaicno	<i>Celtis philippinensis</i>	Ulmaceæ	A heavy, light-colored wood; used for building purposes.
Malabang	<i>Mallotus</i> sp.	Euphorbiaceæ	
Malanangca	<i>Ficus</i>	Moraceæ	A heavy, white wood.
Malapaho	<i>Mangifera</i> sp.	Anacardiaceæ	For buildings and vessels; yields odorous resin used for lighting and for varnish by natives.
Malapalipit or Ti-guisquilis.	<i>Sapindus turozaniinowii</i> Vidal.	Sapindaceæ	
Malapapaya	<i>Polyscias nodosa</i> Seem	Araliaceæ	Used in making boxes.
Malapigas	<i>Desmodium umbellatum</i>	Leguminosæ	A small tree found near the sea-shore.
Malapnatati	<i>Alcornea javensis</i>	Euphorbiaceæ	Use unknown.
Malapuyao	<i>Cynometra</i> sp.	Leguminosæ	Do.
Malarayay	<i>Atalantia nitida</i> Oliv.	Rutaceæ	
Malarayay	<i>Gymnosporia montana</i> Roxb.	Celastraceæ	
Malaruhat	<i>Eugenia</i>	Myrtaceæ	Building, cabinetwork, flooring joists, etc.
Malaruhat na pula	<i>Eugenia cymosa</i> Lam.	do	For cabinetwork.
Malasaquin pula	<i>Aglala</i> sp.	Meliaceæ	Use unknown.
Malasaquinputi	<i>Eugenia</i> sp.	Myrtaceæ	For cabinetwork.
Malasambong	<i>Vernonia arborea</i> Ham.	Compositæ	
Malasangui	<i>Cinnamomum</i> sp.	Lauraceæ	
Malasantol	<i>Sandoricum vidalii</i> Merrill	Meliaceæ	Used in general construction.
Do	<i>Thespesia populnea</i> Corr.	Malvaceæ	A tree of heavy wood, whitish color.
Malatadiay	<i>Cathium arboreum</i> Vid.	Rubiaceæ	
Malatagon	<i>Canarium</i> sp.	Burseraceæ	
Malatambis	<i>Kibara coriacea</i> Perk.	Monimiaceæ	
Malatapay	<i>Alanguium octopetalum</i> Blanco.	Cornaceæ	A small tree, not abundant; yellowish wood spotted with brownish black; highly valued for the construction of fine furniture.
Malatiqui	<i>Albizia</i> sp.	Leguminosæ	
Malatumbaga	<i>Combretum squamosum</i> Roxb.	Combretaceæ	Used in building.
Do	<i>Crudia blancoi</i> Rolfe.	Leguminosæ	Wood flesh red to brick red; little employed for building; gives very good boards for box making.
Malauban	<i>Barringtonia</i> sp.	Lecythidaceæ	
Malayambo	<i>Eugenia</i> sp.	Myrtaceæ	Used in light construction.
Malaban	<i>Terminalia</i> sp.	Combretaceæ	Use unknown.
	<i>Mallotus repandus</i> Muell. Arg.	Euphorbiaceæ	
	<i>Mallotus muricatus</i> Muell. Arg.	do	
Malonguin	<i>Melia candollei</i> A. Juss.	Meliaceæ	
Mamalis	<i>Pittosporum ferrugineum</i> Art.	Pittosporaceæ	
Mabog	<i>Naucllea blancoi</i> Vid.	Meliaceæ	
Mambog	<i>Cephalanthus</i>	Rubiaceæ	Used for light constructions; bark yields red dye.
Mambog	<i>Stephegyne diversifolia</i> Hook.	do	Light wood, grayish color; used in building.
Mambog	<i>Stephegyne parvifolia</i> Korth.	do	Used for building purposes.
Mancono	<i>Zanthostemon verdugonianus</i> Naves.	Myrtaceæ	A valuable timber tree; wood very hard and heavy, found in Mindanao; deep chocolate color.
Manga	<i>Mangifera indica</i> L.	Anacardiaceæ	A valuable fruit tree, the mango.
Mangachapuy or Mangachapoi.	<i>Vatica mangachapoi</i> Blanco.	Dipterocarpaceæ.	A tree giving logs up to 55 feet long by 20 inches square; two varieties, red and white, very elastic, and when seasoned withstands the climate as well as teak; used for masts and decks of vessels, and for all work exposed to sun and rain.
Mangasariqui	<i>Quercus philippinensis</i> A. DC.	Fagaceæ	An oak tree; uses not known.
Mangasinoro	<i>Shorea</i> sp.	Dipterocarpaceæ.	A very valuable timber tree.
Mangasinoro	<i>Fagraea volubilis</i> Jack.	Loganiaceæ	A tree of very large size; ashy yellow; soft and not very durable; little used in building.
Mangasariqui	<i>Quercus ovalis</i> Blanco.	Fagaceæ	
Mangostana	<i>Garcinia ovatifolia</i> Hook f.	Guttiferæ	
Manguil	<i>Eugenia javanica</i> Lam.	Myrtaceæ	

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Manungal	<i>Samadera indica</i> Gaertn	Simarubiaceae	The wood is used in making cups which turn liquid placed in them, bitter; the bitter substance has certain medicinal properties.
Manzanitas	<i>Zizyphus jujuba</i> L.	Rhomaceae	An edible fruit.
Maquitarin	<i>Orophea cumingiana</i> Vidal	Anonaceae	
Mapulat	<i>Palaquium</i> sp	Sapotaceae	Wood straw colored, medium weight; a gutta-percha tree.
Maraligao	<i>Casuarina cinerea</i> Turcz	Flacourtiaceae	
Maran, Marang	<i>Litsea</i>	Lauraceae	Wood reddish yellow; used in housebuilding.
Marang	<i>Artocarpus</i> sp	Moraceae	
Matangarao	<i>Melicope ternata</i> Forst	Rutaceae	
Matangolang	<i>Salacia prinoidea</i> DC.	Celastraceae	
Metobato	<i>Diospyros</i> sp	Ebenaceae	A valuable timber tree.
Mayapi or Mayapis.	<i>Dipterocarpus warburgii</i> Brandis.	Dipterocarpaceae	A valuable timber tree; wood reddish with colored streaks and spots; soft and does not last well; considerably used for box making and in ship construction.
	<i>Melastoma baumianum</i> Naud.	Melastomaceae	
	<i>Melastoma molle</i> Wall.	do	
	<i>Memecylon calleryanum</i> Naud.	do	
	<i>Memecylon cauliflorum</i> Naud.	do	
	<i>Memecylon cumingii</i> Naud.	do	
	<i>Memecylon diversifolium</i> Presl.	do	
	<i>Memecylon elegans</i> Kurz.	do	
	<i>Memecylon preslinum</i> Triana.	do	
Miagas	<i>Eugenia</i> sp	Myrtaceae	
Midbid	<i>Lagerstroemia</i> sp	Lythaceae	A tree with heavy wood, reddish-brown color.
Mili-pili	<i>Canarium</i> sp	Buseraceae	Tree yields white resin.
Molave	<i>Vitex littoralis</i> Deene	Verbenaceae	A very valuable timber tree used in all classes of construction; ship keels, frames of vessels, and general shipbuilding.
Maluanaso	<i>Premna nauseosa</i> Blanco	do	Used in building.
	<i>Murraya elongata</i> A. DC.	Rutaceae	
	<i>Murraya koenigii</i> Spreng	do	
	<i>Phyllanthus triandrus</i> Muell.	Euphorbiaceae	
	<i>Myristica ardisiaefolia</i> A. DC.	Myrtiaceae	
Namaued	<i>Columbia blancoi</i> Rolfe	Tiliaceae	A small tree; the bark yields a strong lash fiber.
Nanga	<i>Artocarpus integrifolia</i> L.	Moraceae	
Nara, Naga or Naga.	<i>Pterocarpus indica</i> L.	Leguminosae	This species and the next are very valuable timber trees; excellent for cabinetwork, furniture, doors, and windows.
Narapula	<i>Pterocarpus vidalianus</i> Rolfe.	do	Used in building and in cabinet-work.
Nato	<i>Palaquium barnesi</i> Merrill	Sapotaceae	A gutta-percha tree.
	<i>Nauclaea cumingiana</i> Vid.	Rubiaceae	
	<i>Nauclaea gracilis</i> Vid.	do	
Nilad	<i>Scyphiphora hydrophyllacea</i> Gaertn.	do	
Nonoc	<i>Ficus</i>	Moraceae	
Opilubut	<i>Ficus</i> sp	do	Mainly used for fuel.
Pagatpat	<i>Sonneratia pagatpat</i> Blanco.	Sonneratiaceae	A tree of moderate size; wood somewhat resembles cork; reddish color of various tints; used for building, especially for under-water work.
Pagsainguin	<i>Canarium villosum</i> Benth. et Hook.	Burseraceae	Bears resin.
Paho	<i>Mangifera altissima</i> Blanco.	Anacardiaceae	A fruit tree.
Pahomotan	<i>Mangifera odorata</i> Griff.	do	Used in making building timbers and in naval constructions.
Pahuhutan	<i>Mangifera longipes</i> Griff.	do	
Pahunan	<i>Mangifera</i> sp	do	Use unknown.
Paihot	<i>Albizia</i> sp	Leguminosae	
Pait	<i>Eugenia</i>	Myrtaceae	A tree with very heavy red wood.



## List of Philippine woods—Continued.

Vulgar name.	Scientific name	Family.	Description and use.
Paitan	<i>Eugenia</i> sp.	Myrtaceæ	
Palac-palac	<i>Paladium latifolium</i> Blanco.	do	A gutta-percha tree.
Palang	<i>Acalypha</i> sp.	Euporbiaceæ	
Palapil	<i>Flacourtia</i>	Flacourtiaceæ	
	<i>Paladium gigantifolium</i> Merrill.	Sapotaceæ	Do.
Palayagan	<i>Bursera javanica</i> Benth. et H. f.	Burseraceæ	
Palavan	<i>Quercus</i>	Fagaceæ	Several species of the genus <i>quercus</i> are found in the Philippines; the oaks.
Palayen	<i>Quercus jordanæ</i> Lag.	do	A very valuable tree.
Palinghuai	<i>Walsura robusta</i> Roxb.	Meliaceæ	A very valuable timber tree.
Palinlin	<i>Buchanania nitida</i> Engl.	Anacardiaceæ	A valuable timber tree.
Palitic.	<i>Ficus ampelas</i> Burm.	Moraceæ	
Palo Maria	<i>Calophyllum inophyllum</i> Linn.	Guttifereæ	A most valuable timber tree; the seeds yield a valuable oil, wood used for ships, houses, wheel hubs, and wheels.
Palo Maria	<i>Kayea lepidota</i> Pierre.	Guttifereæ	A valuable timber tree.
Palo Maria de Monte	<i>Calophyllum wallichianum</i> Planch et Triana.	do	Do.
Palo Mariang Gubat.	<i>Kayea navesii</i> Vesque	do	Do.
Palsaguyuguin	<i>Canarium</i>	do	Wood yellow, medium weight.
Palusapis	<i>Dipterocarpus</i>	Dipterocarpaceæ.	A tree with light wood, dark straw color; for canoes.
Pamalatanguen	<i>Canthium</i> sp.	Rubiaceæ	
Pamiasin			Use unknown.
Panaquitan	<i>Sterculia</i> sp.	Sterculiaceæ	Do.
Panao	<i>Dipterocarpus hispidus</i> Villar.	Dipterocarpaceæ.	For boats, buildings, etc.; yields resin for illumination and varnish.
Pandacaqui	<i>Tabernaemontana coronaria</i> Br.	Apocynaceæ	
Pandacaqui	<i>Tabernaemontana pandacaqui</i> Poir.	do	Used in medicine.
Panganaua	<i>Cropeia enterocarpeida</i> Vid.	Anonaceæ	
Pangurigu	<i>Cratoxylon Blancoi</i> Blume.	Guttifereæ	
Panimlin	<i>Buchanania</i> sp.	Anacardiaceæ	
Paninquinon	<i>Wormia luzoniensis</i> Vidal.	Dilleniaceæ	A valuable timber tree.
	<i>Parahorea plicata</i> Brandis.	Dipterocarpaceæ.	Do.
	<i>Parashorea warburgii</i> Brandis.	do	Do.
Pasac	<i>Mimusops</i>	Guttifereæ	Wood hard, tough, and durable—reddish, reddish-white, or flesh; red color; employed for building purposes; like yacal, but inferior to it.
Pasac	<i>Parinarium corymbosum</i> Miq.	Rosaceæ	
Pasac	<i>Pygeum arboreum</i> Endel.	do	Used in building.
Pasquit	<i>Mimocylon paniculatum</i> Jack.	Myrtaceæ	Heavy wood of reddish color.
Patalo	<i>Commersonia platyphylla</i> And.	Sterculiaceæ	A small tree.
Pototan	<i>Bruguiera ritchiei</i> Merrill.		Used for firewood; bark used for tan and dyes.
	<i>Peltophorum ferrugineum</i> Benth.	Leguminosæ	
Pili	<i>Canarium ovatum</i> Engl.	Burseraceæ	A source of elemigum.
Pincapinchan	<i>Oroxylum indicum</i> Vent.	Bignoniaceæ	
Pingol	<i>Engelhardtia</i> sp.	Juglandaceæ	
Piras	<i>Evodia Roxburghiana</i> Benth.	Rotaceæ	
Pipi	<i>Litsea garciae</i> Vidal.	Lauraceæ	
Pipsic	<i>Avicennia officinalis</i> L.	Verbenaceæ	The ashes are used in the manufacture of soap.
	<i>Podocarpus falciformis</i> Parl.	Comfeseæ	
	<i>Polyalthia suberosa</i> H. f. et H.	Anonocæ	
Ponoan	<i>Feronia elephantum</i> Correa.	Rutaceæ	
Pototan	<i>Cerlops candolleana</i> Roxb.	Rhizophraceæ	Firewood; the bark for dyes and tans; wood reddish brown.
	<i>Pterospermum niveum</i> Vidal.	Sterculiaceæ	A valuable timber tree.
Pugalian	<i>Aglala</i> sp.	Meliaceæ	Used for house posts and bridges.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Paguhan	Caryota urens L.	Palmae	Used for posts and for bridge construction.
Pugany	Decaspermum sp.	Myrtaceae	
Pulanbalat	Eugenia sp.	do	
Pulat	Linociera coriacea Vidal.	Oleaceae	Use unknown.
Putat	Barringtonia racemosa Blume.	Lecythidaceae	Wood white, medium weight.
Puso puso	Litsea chinensis Lam.	Lauraceae	Used in building.
Puso puso	Litsea littoralis Beth.	do	Used in house construction, etc.
Pusopuso	Quercus castellarnauliana Vidal.	Fagaceae	
	Quercus caraballoana F. Vidal.	do	
	Quercus fernandezii Vid.	do	
Quinay-quinay	Bridelia sp.	Euphorbiaceae	
Quio	Ardisia sp.	Myrsinaceae	Used in building.
	Rourea santaloides W. et A.	Cannariaceae	
Salab	Cupania sp.	Sapindaceae	Used in construction of buildings.
Salab	Cupania glabrata	do	Used in house building.
Salab	Hemigyroa canescens Thwaites.	do	
Saladay	Zanthoxylum oxyphyllum Edgew.	do	
Salamugngay	Algaia sp.	Meliaceae	
Salaqui	Chisocheton ceramicus Miq.	do	
Salaquinpula	Amoora rohituka W. et A.	do	
Salay	Zanthoxylum avicennae L.	Rutaceae	
Saleng	Pinus insularis Endl.	Conifereae	A large tree found in the mountains of Iloos, Lepanto, and Benguet; a fine tree; used in house construction and lorchas by natives.
Salincapa	Vitex pubescens Vahl.	Verbenaceae	
Salupisin	Podocarpus cupressina R. Br.	Conifereae	
Sampaloe	Tamarindus indica L.	Leguminosae	The wood is used for carpenter work; bears an edible fruit, the tamarind; roots used in cabinetwork.
Sandana	Anisoptera oblonga Dyer.	Dipterocarpaceae.	A valuable timber tree.
Santol or Santor	Sandoricum indicum Cav.	Meliaceae	Wood reddish and of strong texture; little employed for building purposes; used for cabinetwork, posts, and pillars; fruit edible, much prized.
Sappan Sibucan or Palo-Sapang.	Caesalpinia sappan L.	Leguminosae	Wood orange red; pegs made from it are used in the construction of small sailing craft in place of iron spikes and nails; the wood yields a valuable red dye.
Sapote	Dyospyros ebenaster Retz.	Ebenaceae	A valuable timber tree.
Saua-saua	Flacourtia sepiaria Roxb.	Flacourtiaceae	
Saua-saua	Scolopia dasyantha Benn.	do	
Saslit			Very hard wood; used for house posts.
Sayo	Weinmannia luzonniensis Vidal.	Cunoniaceae	
	Schleichera trijuga Willd.	Sapindaceae	
	Scolopia lanceolata Clos.	Flacourtiaceae	
	Semecarpus albescens Kurz.	Anacardiaceae	
	Serianthes grandiflora Benth.	Dipterocarpaceae.	A valuable timber tree.
	Shorea balangeran Burck.	do	Do.
	Shorea contorta Vidal.	do	Do.
	Shorea furfuracea Miq.	do	Do.
	Shorea philippinensis Brandis.	do	Do.
	Shorea polita Vidal.	do	Do.
	Shorea scrobiculata Burck.	do	Do.
	Shorea vidualiana Brandis.	do	Do.
	Sideroxylon alternatum A. DC.	do	
	Sideroxylon ferrugineum Hook.	Sapotaceae	
	Sideroxylon nitidum Bl.	do	
Sirique	Quercus vidualii F. Vill.	Fagaceae	Used in light structures.
	Sterculia blancoi Rolfe.	Sterculiaceae	
	Sterculia cuneata R. Br.	do	
	Sterculia ferruginea R. Br.	do	
	Sterculia macrophylla Vent.	do	

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Sulipa	Gardenia pseudopsidium Blanco.	Rubiaceae	
Supa	Sindora wallichii Benth.	Leguminosae	A valuable timber tree; used for flooring, pillars, joists, window and door frames, and bridge timbers.
Suparitim			
Supitcait	Leea javanica Bl.	Vitaceae	A small tree.
Suransuran	Gordonia acuminata Vidal.	Theaceae	
Suransuran	Gordonia luzonica Vidal.		
Susongcalabao	Uvaria purpurea Blume.	Anonaceae	
	Symplocos ciliata Presl.	Symplocaceae	
	Symplocos cumingiana Brand.	do	
	Symplocos ferruginea Roxb.	do	
	Symplocos luzoniensis Rolfe.	do	
	Symplocos oblongifolia Vidal.	do	
	Symplocos patens Presl.	do	
	Symplocos polyandra Brand.	do	
	Symplocos pseudospicata Vidal.	do	
	Symplocos villarii Vidal.	do	
Tabigui	Xylocarpus obovatus Juss.	Meliaceae	Wood heavy; deep red color; bark used in dyeing.
Taboc	Aegle decandra Naves.	Rutaceae	Wood is used for making canes; bears an edible fruit.
Tabogar	Mallotus ricinoides Muell.	Euphorbiaceae	Use unknown.
Tabuyog	Ficus racemifera Roxb.	Moraceae	
Tabatac, Talactac, or Lovian.	Castanopsis philippinensis Vidal.	Pagaceae	
Tagatoy	Payena sp.	Sapotaceae	
Taglicot	Ficus haematocarpa Bl.	do	
Taglima	Heptapleurum rigidum	Araliaceae	
Tagocot	Ehretia navesii Vidal.	Borraginaceae	
Tagnao-Tagnao	Astronia Rolfei Vidal.	Melastomaceae	
Talang gubat.	Diospyros embryopteris Pers.	Ebenaceae	A valuable timber tree.
Talisay	Terminalia catappa L.	Combretaceae	Edible fruit, dark, straw colored; medium weight; used in building.
Talisay bundoc.	Terminalia sp.	do	Use unknown.
Taligauan	Pterospermum sp.	Sterculiaceae	
Talolo-on	Ilex cymosa Blume.	Yliciaceae	
Taloto	Pterocymbium javanicum R. Br.	Sterculiaceae	A valuable timber tree.
Tamauyan	Gymnosporia ambigua Vid.	Celastraceae	Used in building.
Tamauyan	Gymnosporia sp.	do	Wood light, white.
Tambis	Eugenia sp.	Myrtaceae	
Tambontambon	Mallotus ricinoides Muell. Arg.	Euphorbiaceae	
Tambontambon	Parnarium salicifolium Miq.	Rosaceae	Bark yields red dye; wood used for light construction.
Tunag	Kleinhovia hospita Linn.	Sterculiaceae	A valuable timber tree; the bark yields a fiber.
Tandangison	Indetermined		Unknown.
Tungal	Bruguiera gymorrhiza Lam.	Rhizophoraceae	Firewood; the bark for dyes and tans.
Tangisan	Ficus sp.	Moraceae	White wood; medium weight.
Tanglon	Amoora sp.	Meliaceae	
Tanguile	Shorea	Dipterocarpaceae	A valuable timber wood; used for canoes, boats, inferior grades of furniture, etc.
Tapulao	Pinus merkusii Jungh et de Vries.	Coniferae	A pine; found in Zambales; used in building.
Taquinaes	Ficus pilosa Reinw.	Moraceae	
Taquipan	Caryota rumphiana Mart.	Palmae	
Taquit	Mallotus moluccanus Muell. Arg.	Euphorbiaceae	
Teca	Tectona grandis L.	Verbenaceae	A valuable timber tree; teak of commerce; little known in the Philippines; exists in Mindanao and said to exist in Negros.
Tenaan	Phyllanthus sp.	Euphorbiaceae	
Tenannbantay	Cyclostemon cumingii Ball.	do	
	Terminalia mollis Rolfe.	Combretaceae	
	Terminalia pellucida Presl.	do	
Tibig	Ficus glomerata Roxb.	Moraceae	White wood; medium weight.
Tibigi	Xylocarpus granatum Koenig.	Meliaceae	Bark used for dyeing.

## List of Philippine woods—Continued.

Vulgar name.	Scientific name.	Family.	Description and use.
Tigalot	Elaeocarpus multiflorus F. Vill.	Elaeocarpaceae.	
Tigcal	Aglaiia sp.	Meliaceae	
Tindalo	Afzelia rhomboidea Vid.	Leguminosae	A very valuable timber tree; used for furniture and flooring, doors, and windows.
Tinganbaguis	Aegiceras floridum RS	Myrsinaceae	
Tinganbaguis	Aegiceras corniculatum Blanco.	do	
Tingan tingan	Pterospermum oblium Blanco.	Sterculiaceae	A valuable timber tree.
Tiquistiquis	Cupania pleuropteris Blume.	Sapindaceae	
Toob or Tua	Bischofia javanica Blume.	Euphorbiaceae	A valuable timber tree; light gray; medium weight.
Toquian	Ternstroemia toquiam F. Vill.	Ternstroemiaceae.	
Tua or Tue	Dolichandrone spathacea K. Sch.	Bignoniaceae	
Tubli	Milletia splendens W. et A.	Leguminosae	For building light constructions, furniture, etc.
Tucanbalao	Sterculia sp.	Sterculiaceae	Heavy dark-red wood.
Tucangcato	Sterculia rubiginosa Vent.	do	
Tugan	Myristica guttaefolia DC.	Myristicaceae	
Tulang manog	Casearia sp.	Flacourtiaceae	
Tula tula	Mallotus floribundus	Euphorbiaceae	
Tumbonaso	Morinda umbellata L.	Rubiaceae	
Uatitie	Colubrina asiatica L. C. Rich.	Rhamnaceae	
Uayan	Quercus blancoi A. DC.	Fagaceae	
Uban	Adina philippinensis Vid.	Rubiaceae	
Uban	Premna sp.	Verbenaceae	
Uos	Unona virgata Blume	Anonaceae	
Urung	Sterculia oblongata R. Br.	Sterculiaceae	A valuable timber tree.
	Fagraea fragrans Roxl.	Loganiaceae	
	Uvaria rufa Blume	Anonaceae	
	Villaria littoralis Vid.	Rubiaceae	
	Villaria rolfei Vid.	do	
	Wormia suffruticosa Griff.	Dilleniaceae	
	Wrightia Candollei, Vid.	Apocynaceae	
	Xanthophyllum griffithii Hook.	Polygalaceae	
Yacul	Shorea plagata Blume.	Dipterocarpaceae.	Reaches a height of 40 to 60 feet, with a diameter of 2 to 3 feet; logs up to 50 feet long by 22 inches square; earthy yellow color; solid and fine texture; proof against white ants and has great strength and tenacity; much used in housebuilding as well as shipbuilding.
Yacul puti	Vatica grandiflora Dyer.	do	A valuable timber tree.
Ypil or Ipil	Afzelia bijuga A. Gray	Leguminosae	A tree giving logs up to 50 feet long by 26 inches square; usually dark red, sometimes ochre yellow, has the good qualities of molav, except resistance to seaworm; excellent for building purposes and joiners' work and for railroad sleepers and posts.



## APPENDIX F.

### MEDICINAL PLANTS OF THE PHILIPPINE ISLANDS.

By Señor LEON M. GUERRERO, *Secretary Exposition Board.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Abang - A bang. Tag.	<i>Oroxylum indi- cum</i> Vent.	Bignoniaceae	Outer part of the root.	Antirheumatic if used in decoction, also anti- dysenteric and dia- phoretic; the leaves are generally used in antirheumatic baths.
Abanico, Vis	<i>Belamcanda punctata</i> Moench.	Iridaceae	Root	Alternative in form of decoction much used in the treatment of cer- tain forms of derma- tosis.
Abilo, Batangas	<i>Garuga pinnata</i> Roxb.	Burseraceae	Bark and leaves.	The bark is astringent. Its sap dropped into the eye dissipates the opacities of the cornea. The sap of the flowers has a reputation in asthma.
Abud, Vis	<i>Eurycles amboi- nensis</i> Herb.	Amaryllidaceae	Bulbs	Employed as an emeto- cathartic in small doses; the leaves are used externally as anti- rheumatic topicals.
Abustra, Iloc Abuta, so called in the neigh- borhood of Manila.	<i>Anamirta cocco- lus</i> W. et A.	Menispermaceae.	Root, stem, and fruit.	See Abuta. A decoction of the roots and stem is used as a febrifuge, tonic, emmenagogue, and abortive, according to the quantity adminis- tered; in Zambales it is also employed as ex- pectorant in bron- chial affections; the seeds are used for poi- soning fish.
Abutra, so called in Manila. (?)	<i>Acalypha indica</i> Linn.	Euphorbiaceae	Root and leaves	See Abuta. The juice of both the root and the leaves is given to children as an emetic and ex- pectorant in bronchi- tis; also administered in decoction.
Acapulco, Ph. Sp.	<i>Cassia alata</i> Linn.	Leguminosae	Leaves	The sap of the leaves is an efficient antihyper- petic, especially when the herpes is in the furfuraceous form.
Achotis, so called in Misamis. Achuete, so called in Manila. Adaán, Iloc	<i>Bixa orellana</i> Linn.	Bixaceae	Bark	Its decoction is employ- ed in febril catarrhs. See Achotis.
Adelfa, so called in many parts of the Islands.	<i>Albizzia proce- ra</i> Benth. <i>Nerium odorum</i> Soland.	Leguminosae Apocynaceae	Bark Bark and leaves.	Yields astringent decoc- tion. Poisonous; with an ad- mixture of oil they are used as external appli- cations in skin erup- tions, irritation, her- pes, etc.

*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Adgao, Vis	<i>Premna vestita</i> Schauer.	Verbenaceae	Roots, leaves, flowers, and fruit.	The decoction is used as a sudorific, pectoral, and carminative.
Adlay, Vis.	<i>Coix lachryma</i> Linn.	Grameneae	Fruit	The starch obtained from the fruit is considered as a dinamogeneous restorative, employed by preference with convalescents.
Adling, Vis	<i>Cynometra ramiflora</i> Linn.	Leguminosae	Leaves	Anti-herpetic, like those of the Acapulco.
(?)	<i>Aerva lanata</i> Juss.	Amarantaceae	Entire plant	The decoction of this plant is a very efficacious diuretic used especially in catarrh of the bladder, and gonorrhea.
Aetan, Tag	<i>Aristolochia tagala</i> Cham.	Aristolochiaceae	Roots	Tonic, carminative, emmenagogue, and very efficient medicine for infantile tympanites.
Agac-ac, Vis.	<i>Amoora rohituka</i> W. et A.	Meliaceae	Bark	Used as astringent in decoction.
Agboligan, Iloc	<i>Clerodendron macrostegium</i> Schauer.	Verbenaceae	Leaves	Employed in decoction and poultices to cure anthrax.
Agboy, Vis	<i>Mussaenda glabra</i> Vahl.	Rubiaceae	Roots and leaves	Used in decoction for certain affections of the chest and lungs.
Agho, Vis	<i>Leucaena glauca</i> Benth.	Leguminosae	Root	Emmenagogue, in decoction.
Agiya ng yang, Vis.	<i>Abrus precatorius</i> Linn.	do	Roots, branches, and seeds.	The roots and branches in decoction are pectoral, the seeds are poisonous but sometimes they are employed macerated as a collyrium.
(?)	<i>Aglaja roxburghiana</i> Miq.	Meliaceae	Fruit	Known to have febrifuge properties.
Agoho, Tag	<i>Casuarina equisetifolia</i> Forst.	Casuarinaceae	Bark	Emmenagogue and ec-bolic when taken in large doses.
Agonoy, Vis	<i>Spilanthes acmella</i> Linn.	Compositae	Root, leaves, and tops.	Vulnerary in decoction.
Agoo, Ibanag, Agoy-oy, Tag	<i>Homonoya riparia</i> Lour.	Euphorbiaceae	Root	See Agoho. In the south of the Archipelago it is used like sarsaparilla as an efficient stimulant in the treatment of certain venereal diseases. The water running at the foot of the shrubs is considered as having depurative properties.
Agusao, Vis	<i>Crinum asiaticum</i> Linn.	Amaryllidaceae	Bulbs and leaves	See Canlará.
Agubahan, Vis				The bulbs are used as ointment and the leaves emollients, both in the form of topicals.
Agubarao, Vis	<i>Vitex trifolia</i> Linn.; Var. <i>obovata</i> , Benth.	Verbenaceae	Leaves	Used in decoction for aromatic baths.
Agufu, Tag	<i>Dysoxylum blancoi</i> Vidal.	Meliaceae	Bark	Administered in fine powder as a safe emetic known also as producing diarrhea.
Aguso, Pang	<i>Taetes patula</i> Linn.	Compositae	Heads	See Agoho.
Ahito, Tag				Decoction is carminative and said to be refreshing.
Aimit, Vis	<i>Ficus glomerata</i> Willd.	Moraceae	Leaves	The leaves as a topical are used as an anti-rheumatic. The sap forms a beverage.
Ajenjo, Ph. Sp.	<i>Crossotephium artemisioides</i> Less.	Compositae	Leaves and tops	In infusion it is a carminative and an emmenagogue.
Ajinco				See Ajenjo.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Ajos, so called in Manila and in the Visayan Islands.	<i>Allium sativum</i> Linn.	Liliaceae	Bulbs	Used as revulsive in headaches, applied on the temples in the form of plaster.
Ajos Ajos ñga Maputi, Vis.	<i>Hymenocallis littoralis</i> Salisb.	Amarillidaceae	Bulbs	Used for healing wounds.
Alagao, Tag				See Adgao.
Alagas, Vis	<i>Semecarpus anacardium</i> Linn.	Anacardiaceae	Oil of the pericarp.	Used as caustic or escharotic and sometimes in the treatment of certain indolent ulcers.
Alagatlí, Tag	<i>Canarium villosum</i> Benth.	Burseraceae	Root and bark	Decoction is used as beverage during childbirth and also as a specific for rheumatism.
Alangit-git, Tag	<i>Ehretia buxifolia</i> Roxb.	Borraginaceae	Leaves	When dried they are used in infusion as substitute for tea.
( )	<i>Alangium aromaticum</i> Thwaites.	Cornaceae	Bark	In decoction it is used as an emetic and diaphoretic useful in fevers.
Albahaca, so called in Manila and other places.	<i>Ocimum sanctum</i> Linn.	Labiatae	Leaves and tops	Used in decoction for aromatic baths.
Albahaca (?), Vis.	<i>Anisomeles ovata</i> R. Br.	do	Seeds and leaves	Decoction is antirheumatic.
Albahaca de limon, Vis.	<i>Ocimum basilicum</i> Linn.	do	Leaves	Used in infusion or decoction as a carminative and stimulant remedy.
(?)	<i>Albizzia lebbek</i> Benth.	Leguminosae	Bark	In decoction it is taken as alterative and tonic. See Abuta.
Albutra, so called in Manila.	<i>Rosa damascena</i> Mill.	Rosaceae	Petals	The same uses as in European medicine.
Alejandria, Manila.	<i>Bauhinia racemosa</i> Lam.	Leguminosae	Bark and leaves	The bark is antisyphilitic and antidiarrhetic; used in topicals on the head in fevers accompanied with headaches.
Alibangbang, Tag				Decoction is antidiarrhetic and antispasmodic. It is also used for aromatic baths in rheumatism.
Alibun, Vis	<i>Blumea balsamifera</i> DC.	Compositae	Leaves	Decoction of the root and bark is used to cure certain affections of the stomach and intestines. Women use it also in childbirth. The leaves are used aromatically in bathing.
Alibutbut, Vis	<i>Tabernaemontana pandacqui</i> Poir.	Apocynaceae	Root, bark, and leaves	Used as emollient collyrium in decoction, also employed to combat strangury; see <i>Commelyna nodiflora</i> Linn.
Aliebagñon, Tag	<i>Commelyna benghalensis</i> Linn.	Commelinaceae	Entire plant	See Alibun.
Alilehon, Vis	<i>Mallotus moluccanus</i> Muell. Arg.	Euphorbiaceae	Bark and leaves	Used as sudorific when slightly heated and applied to the skin.
Alimbobog, Vis	<i>Chloroxylon swietenia</i> DC.	Rutaceae	Bark	See Balaynamoc.
Alintatao, Vis				Employed in decoction for gargles, potions, and almost in every case when a safe astringent is needed.
Alipata, Vis	<i>Excoecaria agallocha</i> Muell. Arg.	Euphorbiaceae	Latex	Known as caustic; nevertheless it is used in healing obstinate ulcers.



## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Almendras, so called in Manila. Alocasoe, Vis.	<i>Clerodendron intermedium</i> Cham.	Verbenaceae	Root, leaves, and tops.	See Banilac.  The root is known to be purgative; the leaves, used either whole or pounded, are applied on the abdomen of parturients in certain complications.
Alon, Vis.	<i>Chenopodium ambrosioides</i> Linn.	Chenopodiaceae.	Leaves and tops.	See Alim. Carminative and emmenagogue, according to some.
Alpasotes, so called in the vicinity of Manila. Aludig, Iloc.	<i>Streblus asper</i> Lour.	Moraceae	Bark and leaves.	The bark is chewed as antidote in snake poisoning; infusion of the leaves is drunk as tea.
Alugbati, Vis.	<i>Basella rubra</i> Linn.	Basellaceae	Roots and sap	The roots are rubefacient; the sap is used to anoint that part of the body attacked by wheel in order to diminish the irritation produced by the malady.
Alum, Vis.	<i>Vitis pedata</i> Vahl.	Vitaceae	Stem and leaves.	See Alim. Astringent when used either fresh or in decoction.
Alusiman ayam, Vis.	<i>Trianthema monogyna</i> Linn.	Aizoaceae	Roots	Administered in decoction as emmenagogue and abortive when taken in large doses.
Alyopyop, Vis.	<i>Eranthemum bicolor</i> Schränk.	Acanthaceae	Roots, stem, and leaves.	Used in decoction against aphtoes and also as cicatrizing of wounds, ulcers, etc.
Amamale, Vis.	<i>Leca sambucina</i> Willd.	Vitaceae	Roots, branches, and leaves.	Vulnerary in decoction.
Amapola, so called in Manila. Amargoso, Tag.	<i>Hibiscus mutabilis</i> Linn. <i>Momordica balsamina</i> Linn.	Malvaceae Cucurbitaceae	Flowers Leaves and fruit.	Pectoral when used in decoction. The sap of the leaves is used as parasiticide and the fruit macerated in oil, is vulnerary; the leaves are used in salad; they also yield an extract taken as a stomachic.
Amarillo, Tag. Amoras, Iloc.	<i>Andropogon muricatus</i> Retz.	Gramineae	Roots	See Ahito. In decoction it is used for tonic baths; its odor serves to preserve clothes and books from moth.
Amor seco, so called in the neighborhood of Manila. Ampaleya, Tag. Amuguís, Tag.	<i>Chrysopogon aciculatus</i> Trin. <i>Koordersiodendron pinnatum</i> Merrill.	Gramineae Anacardiaceae	Entire plant Bark, gum, and leaves.	Diuretic.  See Amargoso. The decoction of the bark is very astringent and it is employed in lotions to cure certain herpetic diseases of humid and obstinate character; it is also a very efficacious gargarism; the leaves cooked or prepared with oil are used on luxations and bruises. The gum mixed with cocoanut oil is used like the leaves.
Amulong, Iloc.	<i>Rhaphidophora pertusa</i> Schott.	Araceae	Sap	Employed to cure snake bites. The spadix of this plant is valued among the natives as an emmenagogue.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Amuyong, Tag.	Melodorum fulgens H. F. et T.	Anonaceae	Seeds	Cooked with oil they make an effective ointment in rheumatic complaints. In decoction they are used in tympanites.
Anabó, Tag., Vis.	Abroma augusta Linn.	Sterculiaceae	Roots	Used frequently as an efficient emmenagogue, especially in the different forms of dysmenorrhea; its use usually gives speedy relief.
Amabong, Vis.				See Anabó.
Anagas, Vis.				See Alagás.
Anagatli, Tag.				See Alagatli.
Anamboligan (?)				See Cabcab.
Anán, Tag.	Amorphophalus decurrens Kunth? (Arum decurrens Blanco).	Araceae	Tubercles	Caustic; are employed in antirheumatic poultices as rubefacients.
Ananagtang, Vis.				See Aguín.
Ananaplás, Tag.				See Adaán.
Ananas, Iloc.	Ananas sativus Schult.	Bromeliaceae	Fruit	Considered vermifuge by the natives when not completely ripened.
Anayapora (?)				See Palis.
Andadasia dad-aquel, Iloc.				See Acapulco.
Andarayan, Iba-nag.	Alstonia scholaris R. Br.	Apocynaceae	Bark	Its decoction is used as a tonic, febrifuge, emmenagogue, anticoleric and vulnerary.
Añgay, Pangas.	Curcuma longa Linn.	Zingiberaceae	Rhizome	Stomachic and vulnerary.
Angélico, Ph. Sp.	Bryophyllum calycinum Salisb.	Grassulaceae	Leaves	Applied as poultice to the soles of the feet in order to stop hemorrhage.
Angud, Pamp.	Achyranthes aspera Linn.	Amarantaceae	Roots	Used as diuretic; the sap is useful in dissipating the opacity of the cornea.
Anibiong, Tag.				See Anabó.
Anibong, Tag.				See Anobó.
Anibung, Vicol and Pamp.	Arenga saccharifera Lab.	Palmea	Ripe fruit	Known as a violent poison for dogs.
Anino, Vis.	Morinda citrifolia Linn Var. bracteata Hook f.	Rubiaceae	Leaves and fruit.	The fruit is used as an emmenagogue; the leaves are applied fresh on ulcers to effect a rapid cure; the sap of the leaves is antarthritic.
Anís, Spanish name common throughout the Archipelago.	Foeniculum vulgare Gaertn.	Umbelliferae	Fruit	Carminative when taken in the form of infusion.
Anís Cahoy, Tag., Vis.	Myristica bracteata A. DC.	Myristicaceae	Bark and seeds	Stimulant; also used as condiment.
Anís Mascada, Tag., Vis.				See Anís cahoy.
Anitao, Pamp.				See Adaán.
Anobran, Iloc.				See Adgao.
Anonang, Tag. Vis.	Cordia myxa Linn.	Boraginaceae	Bark	The decoction is antidyseptic and febrifuge; when reduced to a powder it is a cure for ulcers in the mouth.
Anonang Baquir (?)				See Anonang.
Anten, Iloc.				See Alagatli.
Antipolo, Tag., Pamp., and Vis.	Artocarpus inelusa Linn.	Moraceae	Bark	Its decoction is vulnerary.
Antidoto, so called in Manila.	Ipomoea muricata Jacq.	Convolvulaceae	Seeds	Considered a very efficacious alexipharmic and vulnerary; they are also said to be purgative as like those of the Hederaceae sp.
Antolañgan, Vis. Tag. and Pamp.	Hibiscus rosa-sinensis Linn.	Malvaceae	Roots, bark, leaves, and flowers.	Used as emollient in decoction.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Apaleya, Tag.				See Amargoso.
Apaliá, Pamp.				Do.
Apalit, Pamp.	<i>Pterocarpus Blancoi</i> Merrill.	Leguminosae	Bark and resin.	Use as astringent in aphthoes; the decoction of the wood is nephritic.
Apariagua, Vis.	<i>Laportea gaudichaudiana</i> Wedd.	Urticaceae	Root and leaves.	Used in infusion as diuretic in cases of urinary retention; the leaves are said to cure anthrax if applied locally.
Apasotis, so called in the vicinity of Manila.				See Alpasotes.
Apasotes, Tag.				See Alpasotes.
Apatot, Iloc.				See Anino.
Apayao, Vis.	<i>Homalomena aromatica</i> Schott.	Araceae	Rhizomae.	A reputed antirheumatic; used in embrocation.
Apiapi, Tag.	<i>Avicennia officialis</i> Linn.	Verbenaceae	Seeds.	Cooked with water they are used as maturative poultices, and cicatrifiant of ulcers.
Apuy Apuyan, Tag.	<i>Cleome viscosa</i> Linn.	Capparidaceae	Leaves.	Pounded while fresh they are used as a rubefacient poultice; they are also edible when salted.
Arandon, Iloc.	<i>Wikstroemia ovata</i> C. A. Mey.	Thymelaeaceae	Bark.	The flings of this bark are taken with water or wine as a tonic.
Arañgay, Pamp.	<i>Flagellaria indica</i> Linn.	Flacellariaceae	Stem and rhizomae.	See Balongay.
Arayan, Ibanag.				Considered diuretic in decoction.
Ardatag, Vis.	<i>Elephantopus spicatus</i> B. Juss.	Compositae	Leaves.	Used as vulnerary.
Argao, Vis.				See Adgao.
Aro, Ibanag.				See Agoho.
Arodayday, Vis.	<i>Ipomoea pes-caprae</i> Roth.	Convolvuceae	Leaves.	Useful as an escharotic to extirpate the fungoid growth of ulcers; the leaves cooked are used as antirheumatic topicals.
Arogangay, Tag., Vis., and Pamp.				See Antolangan.
Aroma, common name through out the Islands.	<i>Acacia farnesia</i> Linn.	Leguminosae	Fruit.	Astringent; widely used as a gargarism and a collyrium.
Aroo, Iloc.				See Agoho.
Aroyangyang, Vis.				See Agiyangyan.
Arum, Vis.				See Alim.
Asimao, Tag.	<i>Harrisonia patijuga</i> Benn. (?)	Simarubaceae	Outer part of the root.	The decoction of this root is effective against dysentery, diarrhea, and Asiatic cholera.
Asuañgay, Vis.				See Alocasoc.
(?)	<i>Atalantia monophylla</i> Corr.	Rutaceae	Roots, leaves, and berries.	The root is antispasmodic in decoction; the leaves are cephalic; the berries are antibilious; the oil which is obtained from the berries and leaves is a specific in chronic rheumatism.
Atay atay, Vis.				See Alyopyop.
Ates, so called in almost all the dialects of the Philippine Archipelago.	<i>Anona squamosa</i> Linn.	Anonaceae	Leaves and seeds.	The leaves are used as topicals for certain gastric complaints common to children; the seeds are ecbotic and used for removing vermin from the head.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Ausiman, Vicol.	<i>Portulaca oleracea</i> Linn.	Portulacaceae	Leaves and tops	Used as antihemorrhagic in poultices; in the form of infusion they are taken as a diuretic beverage; also employed to cure burns and certain skin diseases.
Ayañgao, Tag. Ayantoto, Pamp.	<i>Amarantus spinosus</i> Linn.	Amarantaceae	Roots	See Adaán. Decoction of the root is good in the treatment of gonorrhea.
Ayapana, Tag.	<i>Eupatorium ayapana</i> Vent.	Compositae	Leaves	Used in infusion as sudorific and tonic, particularly in fevers.
Ayo, Pamp.	<i>Oxalis corniculata</i> Linn.	Oxalidaceae	Entire plant	Used in dysentery and also in scurvy; when brewed into a decoction it provides a refreshing beverage in fevers.
Ayo, Tag.	<i>Vitis capreolata</i> Don. (?)	Vitaceae	Roots	Used in decoction internally as a powerful diuretic; also employed externally as a lotion to cure scabies.
Ayo, Vis. Ayoban, Vis. Azafran, Ph. Sp. Azucena, so called throughout the Islands.	<i>Polianthes tuberosa</i> , Linn.	Amaryllidaceae	Bulbs	See Agoho. See Alibun. See Angay. Used in decoction to cure gonorrhea and employed as maturative in the form of plasters.
Azucena silvestre, so called in Manila. Bacao, Tag.	<i>Rhizophora mucronata</i> Lam.	Rhizophoraceae	Bark	See Agubahan. Astringent in decoction, used externally and internally.
Bacaoan, Tag. Bacong, Tag. Bacugan, Vis. Bacuit, Pamp. Bacung, Vis. Badiang, Vis.	<i>Alocasia macrorrhiza</i> Schott. ( <i>Calla maxima</i> , Blanco, 1st edition; admitted as good by some authors).	Araceae	Petioles	See Bacao. See Agubahan. See Aguin. See Andarayan. See Agubahan, Vis. The petioles when nearly decayed are ground together with live coal and placed in a piece of cloth to alleviate toothache by applying same on the painful part.
Badiara, Tag., Pamp.	<i>Coleus atropurpureus</i> .	Labiatae	Leaves	Pounded, they are valuable in headaches.
Baenó, Tag.	<i>Nelumbium speciosum</i> Willd.	Nimphaeaceae	Roots, rhizomae, leaves, flowers, and seeds.	The roots, rhizomae, and flowers are employed as astringents. The leaves and seeds are used in poultices.
Bagang, Ibanag. Baganti, Tag., Vis. Baga tambal, Vis.	<i>Zanthoxylum avicennae</i> , DC.	Rutaceae	Bark	See Anan. See Agiyangiang. Febrifuge and poisonous.
Bagawac na morado, Tag.	<i>Clerodendron navesianum</i> Vidal.	Verbenaceae	Leaves	In topicals they are good for healing wounds, ulcers, etc., and also used in tonic baths.
Bagawac, Tag. Bagombong, Vis., of Antique.	<i>Alpinia galanga</i> Swartz.	Zingiberaceae	Rhizomae	See Agboligan. Carminative and stimulant; a decoction of the leaves is used as an antirheumatic stimulant.
Baguilumbang, Tag.	<i>Aleurites saponaria</i> Blanco.	Euphorbiaceae	Seeds	The seeds yield an oil which is employed as a vermicide.
Bahay, Vis.	<i>Pueraria phaseolides</i> Benth.	Leguminosae	Tuberous roots	Used in decoction as febrifuge.
Bahi, Vis. Baho-baho, Vis.	<i>Cassia tora</i> Linn.	Leguminosae	Entire plant	See Anibung. Brewed into decoction it is taken as a vermifuge and purgative.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Bait, Tag., Pamp., Vis.	<i>Euphorbia nerifolia</i> Linn.	Euphorbiaceae	Leaves	The sap extracted from the roasted leaves is used in auricular neuralgia.
Balangot, Tag.	<i>Typha angustifolia</i> Linn.	Typhaceae	Inflorescence	The woolly inflorescence is employed in healing wounds, though it rather ought to be considered as hemostatic.
Balano Balanoyan, Tag.				See Apuy apuyan.
Balanoy, Tag.				See Albahaca.
Balahoy, Tag.				See Albahaca de limón.
Balantaná, Vis.				See Allocaso.
Balanti, Tag., Vis.	<i>Homalantus populifolius</i> Graham.	Euphorbiaceae	Leaves, fruit, and latex.	The leaves and fruit are employed for their toxic effects in fishing; the latex is used mixed with oil in order to render it less caustic in the cure of herpes, and especially circinatus.
Balanti, Vis. (the same name is also given to a excoccaria).	<i>Croton tiglium</i> Linn.	do	Seeds	Violently drastic and eczemenogenic; used as revulsive in cases of rheumatism and cough; it is also used to poison fish.
Balao, Tag.	<i>Dipterocarpus vernicifluus</i> Blanco.	Dipterocarpaceae.	The oleo resin	The same uses as that of the turbinatus.
Balasbas, Tag.	<i>Graptophyllum hortense</i> N. ab. E.	Acanthaceae	Leaves	Used as emollient poultice on ulcers in the hand.
Balasin, Tag., Pamp., Vis.				See Abuta.
Balatong, Tag.	<i>Phaseolus mungo</i> Linn.	Leguminosae	Seeds	The decoction of the seeds is used internally in cases of purulent reabsorption, and also as an effective diuretic in beri-beri; the same seeds either raw or cooked are employed as maturative poultices.
Balatong aso, Tag.	<i>Cassia occidentalis</i> .	do	Seeds and leaves.	The seeds are febrifuge and the leaves purgative and antitherptic, though not so efficient as those of the Aca-pulco.
Balay lamoc, Iloilo.	<i>Mussaenda frondosa</i> Linn.	Rubiaceae	Roots, leaves, flowers, and foliaceous sepals.	The root is used in ictericia as are the fullgrown sepals; the leaves in decoction are emollient; used externally.
Balay namo Iloc.	<i>Crataeva religiosa</i> Ferst.	Capparidaceae	Roots, bark, and leaves.	The root is an alterative, the sap of the bark is a cure in convulsions and tympanites, and the leaves are stomachic.
Balayang?, Vis(?)	<i>Cassia fistula</i> Linn.	Leguminosae	Fruit	The pulp is employed as cathartic.
Balbalosa, Iloc.	<i>Solanum sanctum</i> Linn.	Solanaceae	Leaves and seeds.	The leaves are used in poultices as mitigating and resolvent, the seeds are sedative.
Balbás vaquero, so called in many towns of the Archipelago.	<i>Momordica cochinchinensis</i> Spreng.	Cucurbitaceae	Seeds	Pectoral when taken in form of decoction or pulverized.
Balibago, Tag., Pamp.	<i>Hibiscus tiliaceus</i> Linn.	Malvaceae	Bark and flowers.	The bark is emetic. The flowers are boiled in milk which is then applied to cure earache.
Balicao, Vis.				See Bocawe.

*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Balicbalic, Pamp.	<i>Amomum ciliatum</i> Blume.	Zingiberaceae	Fruit and seeds.	Used as carminative. The seeds are specially used to make rosaries which the women wear round their necks as a perfume.
Balicbalic, Tag.	<i>Pongamia glabra</i> Vent.	Leguminosae	Bark	Yields an abortive decoction; used among the natives of Guimaras.
Balictarin, Tag.				See Bagawac namerado.
Aliencup, Vis.				See Amulong.
Balilang-onac, Tag. (Pasig).				See Abangabang.
Balili, Vis.				See Amor seco.
Alimbing, Tag.	<i>Averrhoa Carambola</i> Linn.	Oxalidaceae	Fruit	The sap is prepared into a sirup which is administered in fever as a cooling drink.
Balingway.				See Arayan.
Baliscug, Vis.	<i>Clerodendron inerme</i> Gaertn.	Verbenaceae	Roots and leaves.	The root is administered in decoction as febrifuge and general alterative, and the leaves in poultices are resolvent.
Balitathan, Vis.	<i>Quisqualis indica</i> Linn.	Combretaceae	Fruit	Vermifuge.
Baliti, Tag., Pamp., Vis.	<i>Ficus concina</i> Miq.	Meraceae	Latex	Vulnerary.
Baliti, Tag., Vis., and Pamp.	<i>Ficus</i> sp.	do	do	Employed to mature abscesses.
Baliyoco, Vis.	<i>Andropogon schoenanthus</i> Linn.	Graminae	Roots and leaves.	The roots yield a diuretic decoction; the leaves also, when brewed into a decoction, are used to give an aroma to baths.
Bolocanad, Tag.				See Baguillumbang.
Balocas, Tag.	<i>Allanthus malabarica</i> DC.	Simarubaceae	Bark	Astringent and bitter; employed either in decoction or in powder in the treatment of dyspepsia and dysentery; it also has febrifuge properties.
Baloc baloc, Tag., Tayabas.				See Bocaboc.
Balogo, Vis., Pamp.	<i>Entada scandens</i> Benth.	Leguminosae	Stem	Macerated in cold water it makes a cleansing soap; it is emetic and produces sneezing.
Balongay, Vis.	<i>Moringa pterygosperma</i> Gaertn.	Moringaceae	Bark	The bark pounded, is used as a rubefacient remedy; the decoction of the root is considered antiscorbutic.
Balunos, Vis.				See Balogo.
Balubat, Tag.	<i>Anacardium occidentale</i> Linn.	Anacardiaceae	Fruit	The oil of the pericarp is used as a powerful cautery.
Balucanag, Vis., Pamp.				See Baguillumbang.
Balungcawayan, Vis.	<i>Pittosporum brachysepalum</i> Turcz.	Pittosperaceae	Bark and leaves.	An aromatic decoction is brewed from the leaves and used by women, after childbirth, in their baths.
Balungcawayan, Vis.	<i>Pittosporum floribundum</i> W. et A.	do	Bark	Used in powder in small doses as febrifuge; antidotal if taken in greater quantity; also effective in bronchitis.
Bamban, Tag.	<i>Maranta dichotoma</i> Wall.	Marantaceae	Roots	When brewed into decoction the roots act as an antidote in snake bites and blood poisoning generally.
Banag, Vis.				See Camagsa.
Banagan, Vis.				See Camagsa.
Banati, Pamp.				See Camuning.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Banato, Tag., Vis.	<i>Mallotus philippinensi</i> Muell. Arg.	Euphorbiaceae	Glands	They have been used as antiherpetic, but their main application is as anthelmintic taken internally.
Banay banay, Iloc.	<i>Naravella zeylanica</i> D. C.	Ranunculaceae	Leaves	Used fresh or pounded as a revulsive.
Bangcal, Vis. and Pamp.	<i>Sarcocephalus subditus</i> Miquel.	Rubiaceae	Bark	Oedentalgic, antidiarrhetic, vulnerary, etc.
Bancalauag, Vis.	<i>Terminalia</i> sp.	Cumbretaceae	do	Astringent and tonic; used internally and externally; known to have lithontriptic qualities.
Bancudo, Tag., Vis.				See Anino.
Bangan, Tag.				See Baeno.
Bangar, Iloc.	<i>Sterculia foetida</i> Linn.	Sterculiaceae	Bark and fruit	The decoction of the bark is an aperient, diaphoretic and diuretic, useful in cases of dropsy and rheumatism; the decoction of the fruit is astringent.
Bangati, Tag., Vis.				See Agiyangyang.
Bangbang, Iloc.	<i>Plumbago zeylanica</i> Linn.	Plumbaginaceae	Roots	Pounded, they are used for blistering, and in decoctions they are employed as antiscabious; are also ecbotic.
Bangbansit, Iloc.	<i>Hyptis suaveolens</i> Poit.	Labiatae	do	Yields an emmenagogue decoction, and stimulant if employed in rheumatism.
Bangcolong, Tag.	<i>Cardiospermum halicacabum</i> Linn.	Sapindaceae	Bark and leaves	The decoction of the root is diaphoretic and good for catarrh of the bladder; the leaves are considered antirheumatic either taken internally in form of beverage or externally in oil embrocations.
Bangcoro, Tag., Vis.				See Anino.
Banhug, Vis.	<i>Hydnophytum formicarum</i> Jack.	Rubiaceae	Tuberosities	Used in the form of decoction as an efficient remedy in liver and intestinal complaints.
Banġil, Vis.	<i>Sophora tomentosa</i> Linn.	Leguminosae	Roots, stem, and seeds.	The decoction of the root or stem is considered as anticholeric, as well as that of the seeds, which is purgative besides.
Banglay, Tag., Vis.	<i>Zingiber cassumunar</i> Roxb.	Zingiberaceae	Rhizomae	Pulverized they are given as antidiarrhetic.
Banilac, Vis.	<i>Terminalia catappa</i> Linn.	Combretaceae	Bark and leaves	The bark is astringent and the sap of the tender leaves mixed and cooked with oil of the kernel, is, according to P. Blanco, a specific against leprosy.
Banquilin, Tag., Pamp., and Vis.	<i>Phyllanthus distichus</i> Muell.	Euphorbiaceae	Bark	Yields a decoction which is employed in bronchial catarrh.
Baramo, Iloc.				See Alecasoc.
Barumaran, Vis.				See Baliyoco.
(?)				See Banġil.
Bantana, Vis.	<i>Barringtonia acutangula</i> Gaertn.	Leechidaceae	Roots, bark, and fruit.	Toxic; used for stupefying fish.
Barubatones, Vis.	<i>Kyllinga monocephal</i> Rottb.	Cyperaceae	Rhizomae	Yields a diuretic decoction; externally used, mixed with oil, it is employed to combat certain forms of dermatosis.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Basilolag, Iloc. Bastón de San José, so called in Iloilo.	<i>Costus speciosus</i> Smith.	Zingiberaceae	Rhizomae	See Aguiu. An aromatic medicine not much used, though sometimes substituted for the <i>Koempferia</i> sp.
Batad, Tag.	<i>Sorghum vulgare</i> Pers.	Gramineae	Fruit	Yields a decoction much like that of barley which is used similarly. See Calaad.
Batang batang, Vis., of Cebu. Bato bato, Tag.	<i>Ipomoea reniformis</i> Choisy.	Convolvulaceae	Leaves and tops.	Employed sometimes as a diuretic in the form of decoction.
Batobatonis, Tag.	<i>Euphorbia pilulifera</i> Linn.	Euphorbiaceae	Entire plant.	Used as antidote, hemostatic, sedative and soporific; it is also very efficacious in expelling the dyspnea of asthmatics.
Bauang, Tag., Iloc., and Vis. (?)	<i>Bauhinia tomentosa</i> Linn.	Leguminosae	Bark	See Ajos. In decoction it is antidiysenteric and sometimes taken to cure the enlargement of the liver.
Bayabas, so called throughout Philippine Islands.	<i>Psidium guyava</i> Linn.	Myrtaceae	Bark and leaves.	Astringent, vulnerary, and antidiarrhetic.
Bayabasan, Tag. Bayag cambing, Tag.	<i>Caesalpinia bonducella</i> Fleming.	Leguminosae	Seeds	See Cacaocacaon. Febrifuge, tonic, administered in powder.
Bayacusa, Tag.	<i>Voacanga Cumingiana</i> Rolfe.	Apocynaceae	Fruit	Pounded, they are used to stupefy eels.
Bayang bayang, Vis. Bayanti, Tag., Vis. Bayati, Tag., Vis., Pamp.				See Ayantoto. See Balanti. See Abuta.
Bayoc, so called in Paragua.	<i>Pterospermum acerifolium</i> Willd.	Sterculiaceae	Bark and flowers.	Charred and mixed with the glands of the <i>Mallotus philippinensis</i> Muell. Arg., are used to cause suppuration in smallpox.
Boyago, Tag. Betis, Tag., Pamp.	<i>Illipe betis</i> Merrill.	Sapotaceae	Wood and latex.	See Balogo. The latex applied on the abdomen is said to expel worms; the powder obtained from the wood provokes sneezing.
Bias bias, Pamp. Bias bogo, Tag.	<i>Ammania baccifera</i> Linn.	Lythraceae	Leaves	See Alicabangon. Caustic, and used similarly to cantharides as a substitute for blistering plaster.
Bibili, Vis. Bigá, Tag., Pamp., Vis., Iloc., and Ibanag.				See Anonang. See Badiang.
Bilan, Pamp.	<i>Macaranga tannarius</i> Muell.	Euphorbiaceae	Roots	In decoction it is used to cure hemophthisis.
Bilimbing, Tag. Bilogo(?), Tag. (?)	<i>Celastrus paniculata</i> Willd.	Celastraceae	Seeds and leaves.	See Balinbing. The seeds when pulverized are administered as antirheumatic and in cases of paralysis; the sap of the leaves is given as an antidote to opium.
Bilos, Pamp. Biluca				See Alim. See Beanó.
Bingabing, Tag.	<i>Macaranga mappa</i> Miill.	Euphorbiaceae	Resin	Used as astringent gargle for ulcers in the mouth.



*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Binunga, Tag., Pamp., Vis. Bira, Vis. Biri, Tag.				See Bilan.
	<i>Carthamus tinctorius</i> Linn.	Compositae	Fruit and seeds. Floscules	See Balicbalic, Pamp. The water in which they have been macerated stops visceraic irritation when applied at frequent intervals to the pustules.
Bisaco, Vis. Bitá, Vis. Bitanhol, Tag.				See Amulong. See Andarayan.
	<i>Flacourtia cataphracta</i> Roxb.	Flacourtiaceae	Fruit	Considered as having acid properties and hence are sometimes employed in certain bilious complaints.
Bitanhol, Tag., Pamp., and Iloc.	<i>Calophyllum inophyllum</i> Linn.	Guttiferae	Leaves, oil, and oleo resin.	The water in which the leaves have been pressed is used as an efficient astringent against hemorrhoids; the oil obtained from the seeds and the oleo resin forms a very energetic cicatrizant; the latter is used as a balsamic substance in affection of the lungs.
Bitag, Vis. Pamp., and Iloc. Bitnong, Iloc.				See Bitanhol.
	<i>Kleinhovia hospita</i> Linn.	Sterculiaceae	Bark and leaves.	The bark and leaves are poisonous; in Marinduque they are employed to poison palis (eels); the decoction of the leaves is antiscabious.
Bitogo, Tag., Vis.	<i>Cycas circinalis</i> Linn.	Cycadaceae	Bracteas and fruit.	Used by the Filipinos as vulnerary of excellent virtues.
Bitongol, Tag.	<i>Flacourtia sepiaria</i> Roxb.	Flacourtiaceae	Bark, leaves, and fruit.	The same properties as the <i>F. Romontchi</i> .
Bitoon, Vis. Biwas, Tag.				See Botong.
	<i>Bruguiera caryophylloides</i> Blume.	Rhizophoraceae	Bark	Astringent in decoction.
Boa, Iloc.	<i>Areca catechu</i> Linn.	Palmae	Seeds	Besides their uses for chewing, they are also much employed externally as an astringent; the tender seeds are said to be purgative, and the ripened ones grated are vermifuge; some care must be taken in grating as they contain poisonous elements.
Bobog, Vis. Bocaboc, Tag., Vis.				See Bangar.
	<i>Scaevola koenigii</i> Vahl.	Goodeniaceae	Roots	Yield a decoction used in beri-beri and certain syphilitic affections, and also in dysentery; the leaves are smoked like tobacco.
Bocawe, Tag.	<i>Guadua distorta</i> Rup. ( <i>Schyzostachyum agutiflorum</i> Munro.)	Gramineae	Rhizomae	Brewed into a decoction it makes a refreshing beverage, and the young shoots roasted are used to dissipate the opacity of the cornea.
Bogtótac, Vis. Bolagtób, Vis.				See Aludig.
	<i>Solanum nigrum</i> Linn.	Solanaceae	Leaves	When prepared into poultices they are sedative and resolvent; prepared as an alcoholate they alleviate pains of various kinds.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Bol-logo, Iloc				See Balubat.
Bolongtam-bal, Vis.				See Aguilu.
Bolucay, Vis.				See Bocawe.
Boñga, Tag., so called in the native dialects.				See Boa.
Boñgabong, Vis.				See Biñgabing.
Bosboron, Vicol				See Bocaboc.
Bosicad, Vis.				See Barubatonos.
Botanggubat, Tag				See Balanti, Tag., Vis.
Boto, Tag., Vis.				See Bocaboc.
Botobotones, Pamp.				See Batobatonis.
Botong, Tag. and Vis.	<i>Barringtonia speciosa</i> Forst.	Leechthidaceae	Leaves and fruit	The fruit is employed to stupefy fish, and the leaves when fresh are used in topicals for rheumatism.
Botong botong, Tag.				See Botong.
Bowi, Vis.				See Batobatonis.
Bubuy, Tag.	<i>Ceiba pentandra</i> Gaertn.	Bombacaceae	Outer part of the roots, and tender fruit.	The bark is vomitive, and the tender fruit is used as emollient; this bark is preferred to that of the Malabulac as aphrodisiac and brewed into a decoction; is a specific in febrile catarrh.
Bubuygubat, Tag.	<i>Thespesia populnea</i> Crr.	Malvaceae	Bark, leaves, and juice of the fruit.	The decoction of the bark is alterative if administered internally, or externally as embrocation; the decoction of the leaves is reputed as emollient and antiscabious; the juice is sometimes used in certain herpetic diseases.
(?)	<i>Buchanania latifolia</i> Roxb.	Anacardiaceae	Seeds and oil	The seeds are used in marmalades, considered as pectoral and the oil as a specific in baldness.
Bueng, Pamp.	<i>Acorus calamus</i> , Linn. Var. <i>terrestris</i> Engl.	Araceae	Rhizomae	Administered in decoction as stimulant and carminative.
Bugayon, Iloc				See Agiyanyiang.
Bulac, Tag.				See Bubuy.
Bulacan, Tag.	<i>Ipomoea turpethum</i> R. Br.	Convolvulaceae	Roots	A drastic purgative.
Bulacan, Tag.	<i>Ipomoea grandiflora</i> Lam.	do	Stem and resinous gum.	Administered in powder for their purgative properties.
Bulacan, Vis.				See Buygubat.
Bulacastila, Tag., some parts.	<i>Asclepias curassavica</i> Linn.	Asclepiadaceae	Roots	Employed both in decoction and pulverized as an emetic, having similar effects as ipecacuanha.
Bulala, Iloc				See Bangcal.
Bulanbulan, Vis.				See Apariagua.
Bulanos, so called in Panay.				See Balogo.
Bulao-bulao, Vis.	<i>Parameria philippinensis</i> Radlk.	Apocynaceae	Bark	Macerated in oil it is an efficacious vulnerary; also used internally to cure tuberculosis.
Bulaon, Tag.	<i>Vitex pubescens</i> Vahl.	Verbenaceae	Roots	Uses not known.
Bulaw, Vis.				Employed as poison for fish.
Bulaydawá, Vis.	<i>Crotalaria verrucosa</i> Linn.	Leguminosae	Seeds	Chewed; they are applied locally to cure certain complaints of the stomach.
Buli, Tag., Vis.	<i>Corypha umbraculifera</i> Linn.	Palmae	Young plants	Brewed into decoction and administered in febrile catarrh.
Buñalon, Vis.				See Apiapi.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Bunlao, Vis.	<i>Justicia gendarussa</i> Linn.	Acanthaceae	Leaves	Used fresh in topicals to cure the edema of beri-beri and rheumatism; also used in decoction for bathing during childbirth.
Buntot capon, Tag.	<i>Asplenium falcatum</i> Lam.	Felices	Fronde	Powerful diuretic in the form of decoction used in the treatment of anury, especially that produced by beri-beri.
Buri, Tag., Vis.				See Buri.
Busain, Vis. of Leyte.	<i>Sterculia campanulata</i> Wall.	Sterculiaceae	Bark and fruit	Known as poisonous; the bark yields a dye.
Busbusilac, Tag. and Iloc.	<i>Amoora canarana</i> Hiern.	Meliaceae	Roots	Yields a decoction which is employed to cure leucorrhea.
Busilac, Tag., Iloc.				See Busbusilac.
Buta, Tag.				See Alipata.
Butá butá, Tag. Pamp.				Do.
Butang gubat, Tag.				See Balanti.
Butong, Vis.				See Balic balic.
Do	<i>Bambusa blancoi</i> Steud.	Gramineae	Sap	The aqueous sap of this plant is much esteemed by the Filipinos as a remedy for phthisis.
Butuhan, Tag.	<i>Musa trogloditarum</i> Blanco. <i>Musa uranoscopus</i> Rumph.?	Musaceae	do	Vulnerary; the sap running from the foot of the cut trunk is a cure for chordee; also used for urethral injections in gonorrhea.
Buy, Iloc.				See Butuhan.
Buyayawa, Vis.				See Batobatonis.
Buyo, Vis.	<i>Piper betle</i> Linn.	Piperaceae	Leaves	The leaves, together with lime and betel nut, constitute a mastic in general use among the Filipinos, who consider it a preservative of the teeth and a prophylactic against certain complaints of the stomach; greased with lard or ajonjolí oil they are much used by the natives as a carminative medicine applied on the stomach of children suffering from gastric disorders.
Buyo buyo, Vis.	<i>Piper caninum</i> A. Dietr.	do	Roots	The root is chewed and the saliva swallowed, or it is brewed into a decoction as a cure for colic.
Buyo it amo, Vis.				See Buyo buyo.
Buyo it ayam				Do.
Buyo it linti, Tag.				Do.
Buyoc buyoc, Tag.				See Balbás vaquero.
Cabag hambalos, Vis.				See Bangal.
Caballero, so called in Manila and other places.	<i>Poinciana pulcherrima</i> Swartz.	Leguminosae	Bark and flowers	Known as having febrifuge and emmenagogue properties; uses almost unknown to Filipinos.
Cabatete, Tag.	<i>Colubrina asiatica</i> Brongn.	Rhamnaceae	Leaves	Used in decoction to alleviate irritation and cure certain diseases of the skin.
Cabatiti, Tag. (Batangas).	<i>Rhamnus wightii</i> W. et A.	do	Bark	Used in decoction as tonic and astringent.
Cabay cabay, Tag., Vis.				See Bangil.
Cabcab, Vis.	<i>Polypodium Quercifolium</i> Linn.	Filices	Rhizoma	In decoction used as astringent; in concentrated form they are anthelmintic.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Cabcaban, Vis.				See Cabcab.
Cabcabun, Vis.				Do.
Cabcaron, Iloc.				See Artadag.
Cabiqui, Tag. and Vis.	<i>Mimusops elengi</i> Linn.	Sapotaceae	Bark and green fruit.	The bark as well as the fruit yields a powerful astringent remedy; as gargarism both are used to strengthen the gums; they are further employed in lotion for ulcers and in urethral injections for gonorrhea.
Cabitecabag, Tag.	<i>Mezoneurum gabrum</i> Desf.	Leguminosae	Leaves	Decoction useful in asthma.
Cabling, Tag.	<i>Pogostemon heyneanus</i> Benth.	Labiatae	Leaves and tops	Act as preservative against moth; also employed in baths for their antirheumatic action.
Cabrab, Tag.	<i>Erythrina indica</i> Linn.	Leguminosae	Bark, leaves, and seeds.	In the form of decoction they are antiasthmatic and the scrapings of the bark are maturative of tumors; the seeds when used in poultice are anti-cephalalgic.
Cabrá cabrá, Vis.	<i>Heliotropium indicum</i> Linn.	Borraginaceae	Leaves and sap	The sap mixed with salt is useful in clearing the vision.
Cabugao, Vis.				See Lucban.
Cabusisi, Iloc.				See Calachuche.
Cacao, so called in all the Archipelago.	<i>Theobroma cacao</i> Linn.	Sterculiaceae	Root	The decoction brewed from the root is emmenagogue and ecbolic.
Cacaocacaoan, Tag.	<i>Lunasia grandifolia</i> Miq. and <i>Lunasia amara</i> Blanco.	Rutaceae	Bark and leaves	The bark and leaves are used in certain gastric disorders; they are poisonous and have a direct action on the heart.
Cacauate, Tag.	<i>Gliricidia maculata</i> Benth.	Leguminosae	do	The sap obtained from the bark by pounding is an affective remedy for scabies, and so is the decoction of the leaves if employed externally; the leaves are also used in fish poisoning.
Cachumba, Tag., Pamp., and Vis.				See Biri.
Cacuentasan, Tag.	<i>Canna indica</i> Linn.	Cannaceae	The rhizomae	In decoction diuretic and when macerated in water are said to restrain the epistaxis.
Cadayohan, Tag.	<i>Celosia argentea</i> Linn.	Amarantaceae	Seeds	Antidiarrhetic and aphrodisiac in decoction or fine powder; the leaves are edible, though never eaten by women during menstruation.
Cadlon, Vis.				See Cabling.
Cadlum, Vis.				Do.
Cadpaayan, Iloc.				See Bunlao.
Cad-yos, Vis.	<i>Cajanus indicus</i> Spreng.	Leguminosae	Leaves	Used in decoction to alleviate the irritation of certain forms of dermatosis.
Café, so called in all the dialects of the Philippines.	<i>Coffea arabica</i> Linn.	Rubiaceae	do	An infusion is drawn from the leaves, which is taken in the same way as tea.
Cacuinidi, Vis.	<i>Vitis trifolia</i> Linn.	Vitaceae	do	Yield an antiscorbutic decoction; the sap of the leaves has similar properties.
Caguios, Tag.				See Cad-yos.
Cahoy dalaga, Tag.				See Balay-lamoc.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Calaad, Iloc. (Abra and Agoo.)	<i>Cissampelos pareira</i> Linn.	Menispermaceae.	Roots and leaves.	Brewed into a decoction, it is diuretic, lithon- triptic, pectoral, and febrifuge; the leaves pounded are used to cure snake bite.
Calabou, Tag.	<i>Ottelia alismoides</i> Pers.	Hydrocharitaceae.	Leaves	Used in topicals to cure hemorrhoids; some think that this plant has rubefacient prop- erties.
Calacalamayan, Tag. (Batan- gas.)				See Calaad.
Calachuche, Tag., Vis.	<i>Plumeria acutifolia</i> Poir.	Apocynaceae.	Bark	In decoction it is purga- tive, emmenagogue, and febrifuge; the la- tex is also used to the same effect.
Calambibit, Tag.	<i>Caesalpinia Bonduc</i> Fleming.	Leguminosae.	Seeds	Pulverized they are febrifuge and tonic.
Calambibit man- san, so called in Manila and suburbs.	<i>Caesalpinia Bonduc</i> Roxb.	do	Roots, leaves, and seeds.	Emmenagogue, deab- struent, and febrifuge used in pulverized form; the seeds are thought by some to be effective against lep- rosy and are also ma- turative and anti- hemorrhagic; admin- istered internally when roasted and pulverized; spread on ricine leaves they are applied externally against hydrocele; the sap of the leaves is given to children as vermifuge and also as an antiperiodic in fe- vers.
Calamiás, Tag.	<i>Averrhoa bilimbi</i> Linn.	Oxalidaceae.	Fruit	Used in the same man- ner as Ballimbing.
Calampinay, Tag.	<i>Dodonaea viscosa</i> L.	Sapindaceae.	Bark	It is an efficacious as- tringent in humid eczemas and simple ulcers when employed in decoction; it is also considered as a good febrifuge.
Calangeang, Vis.	<i>Heptapleurum venulosum</i> Seem.	Araliaceae.	Leaves and resin.	The leaves yield an ef- fective antiscorbutic decoction; the resin is vulnerable.
Calangung-ug, Vis.	<i>Tournefortia sarmentosa</i> Lam.	Boraginaceae.	Leaves	Employed especially in destroying the larvae which grow in ulcers of cattle.
Calantás, Tag.	<i>Cedrela toona</i> Roxb.	Meliaceae.	Bark and flowers.	Astringent, anti-perio- dic, and tonic; the flowers are reputed emmenagogue.
Calapinay, Tag.				See Calampinay.
Calasusi, Tag.				See Calachuche.
Calatuche, Vis.				Do.
Calawag, Vis.				See Angay.
Calayate, Vis.	<i>Tectona grandis</i> Linn f.	Verbenaceae.	Bark and leaves.	The leaves, either fresh or dried, are used in decoction as an excel- lent remedy for hem- ophthisis; the same decoction taken in gargles cures sore throat.
Calay calay, Tag.	<i>Monocarpia blancoi</i> Villar.	Anonaceae.	Fruit	Employed in decoction to cure dysmenorrhea.
Calatay, Pamp.				See Campupot.
Califigad, Pamp.	<i>Cinnamomum pauciflorum</i> Nees.	Lauraceae.	Bark	Has rubefacient prop- erties utilized in head- aches and rheuma- tism; used also as con- diment.

*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Caliñgad, Tag., Vis.				See Caliñgad.
Calisay, Pamp.				See Banilac.
Calit-calit, Tag.				See Caguindi.
Calius, Tag.				See Aludig.
Calomata, Tag.	<i>Clausena excavata</i> Burm.	Rutaceae	Leaves	When stuffed into pillows and lain upon, they have a soporific effect; they are also used in baths in cases of rheumatism.
Caloo, Vis.				See Agiyangyang.
Calumbang, Tag.				See Baguilmumbang.
Calumpang, Tag.				See Bangar.
Calumpang salati, Tag.	<i>Carapa moluccensis</i> Lam.	Heliceae	Bark, roots, and seeds.	The bark is astringent, much used for dyeing purposes; the fruits and seeds are employed as an antidiarrhetic in powder or in decoction.
Calunpit, Tag.	<i>Terminalia edulis</i> Blanco.	Combretaceae	Fruit	Used in collyrium in the same manner as the fruits of the Arom, and also in lotions in cases of humid herpeticism or eczema.
Calunzay, Tag.				See Balongay.
Calut, Vis.	<i>Dioscorea triphylla</i> Linn.	Dioscoreaceae	Tubercles	Used raw or cooked as an anodyne and maturative, in cases of tumors and bubos, and also against arthritic and rheumatic pains, etc.
Camagsá, Tag.	<i>Smilax indica</i> Linn.	Liliaceae	Rhizomae and roots.	Depurative if used in the form of decoction.
Camagsá taquilis, Tag.	<i>Rourea heterophylla</i> Planch.	Connaraceae	Roots and wood	Sudorific in decoction, also depurative and generally taken as alterative in cases of herpeticism more or less marked.
Camaisa, Tag.				See Balanti.
Camalagui, Vis.	<i>Tamarindus indica</i> Linn.	Leguminosae	Bark, leaves, and fruit.	The decoction of the bark is administered in cases of internal injuries; that of the leaves is used as tonic in baths; the pulp of the fruit is laxative.
Camaliñgay, Tag.				See Balongay.
Camanchiles, so called around Manila.	<i>Pithecolobium dulce</i> Benth.	Leguminosae	Bark and seeds.	The bark is astringent and is used especially in tanning processes; the seeds taken internally are reputed antidotal.
Camandag, Vis.				See Balanti.
Camangianis, Tag.				See Calamata.
Camantigui, Tag.	<i>Impatiens balsamina</i> Linn.	Balsaminaceae	Leaves	The leaves are pounded and used in poultices to dissolve whitlows.
Camantulan, Vis.				See Bahó-bahó.
Camaog, Vis.	<i>Geodorum semicristatum</i> Linn.	Orchidaceae	Tuberosities	Emollient when used in poultice.
Ca maria, Tag.	<i>Artemisia vulgaris</i> Linn.	Compositae	Leaves and tops.	Used as carminative and emmenagogue.
Camatsilis, Tag.				See Camanchiles.
Cam chò, Tag.				See Malaubi.
Camías, Tag.				See Calamiás.
Camiring, Iloc.	<i>Semecarpus perrottetii</i> March.	Anacardiaceae	Fruits	The tincture of the fruits has been given in leprosy, but without results.
Camocmotihan, Tag.	<i>Ipomoea bonanox</i> Linn.	Convolvulaceae	Roots and seeds	Reputed antidotal to snake bite.
Camoting cahoy, Tag., Vis.	<i>Manihot utilisima</i> Pohl.	Euphorbiaceae	Bark of the trunk.	Its decoction is antirheumatic.
Camot pusá, Tag.				See Asimao.
Camotsiles, Tag.				See Camanchiles.

*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Campanelo, Manila.	<i>Thevetia nerifolia</i> Juss.	Apocynaceae	Bark	In form of decoction it is given in regulated doses as emetic and febrifuge; effective in intermittent fevers.
Campanero (?) Manila.	<i>Alamanda cathartica</i> Linn.	do	Bark and leaves	The whole plant is poisonous; when brewed into a decoction it is antidotal administered in small doses.
Campanilla azul, Manila.	<i>Ipomoea hederacea</i> Jacq.	Convolvulaceae	Seeds	Pulverized, they are administered as purgative and anthelmintic.
Campi, Vis.	<i>Jasminum sambac</i> Aiton.	Aleaceae	Flowers	See Balic balic.
Camputot, Pamp., Tag.				Applied as a poultice to the lacteal glands of women to prevent secretion of milk.
Campuput, Tag.	<i>Murraya koenigii</i> Spreng.	Rutaceae	Roots, bark, and leaves.	See Alibutbut.
Camuning, Tag.				The root and bark have stimulant action and are applied externally to cure the sting of poisonous insects; the leaves applied in the same manner are considered as an efficacious antidyenteric, anti-herpetic, and febrifuge.
Camurang, Vis.	<i>Memecylon edule</i> Roxb.	Melastomataceae.	Roots and leaves.	See Amulong.
Candon, Iloc				The roots in decoction are useful in certain irregularities in menstruation, and the leaves in infusion are used as an astringent collyrium.
Candarona, Iloc.	<i>Cinnamomum burmanni</i> Blume.	Lauraceae.	Bark and leaves.	See Galinggad.
Canela, so called throughout the Archipelago.				Uses the same as Ceylon cinnamon; the leaves yield a stimulant beverage and a carminative.
Canela, Vis.	<i>Ipomoea reptans</i> Poir.	Convolvulaceae.	Tops	See Albahaca de limón.
Cangay, Pamp.				See Bagatambal.
Cangcong, Tag.	<i>Strychnos ignatii</i> Berg.	Loganiaceae.	Bark and seeds.	Edible and mildly laxative.
Canlalawang, Tag.				See Alocasoc.
Canlará, Vis.	<i>Diospyros multiflora</i> Blanco.	Ebenaceae	Bark, leaves, and fruits.	In small doses, are febrifuge, anticholeric and tonic; also effective in some forms of paralysis; poisonous.
Canomoy, Tag., Vis.				Employed to stupefy fish; the leaves and the bark, owing to their causticity, are used externally as anti-herpetic.
Cansasaga, Tag. and Pamp.	<i>Canseora degusata</i> Roem et Schult.	Centianaceae	Entire plant.	See Agiyangyang.
(?)				Tonic; little known in the Philippines, though employed by some in a similar way as the <i>Chang bató</i> .
Cansilan, Vis.	<i>Cratogeomys blanci</i> Blume.	Guttiferae	Roots	The decoction of the bark is galactagogue.
Cansilay, Vis.	<i>Paederia foetida</i> Linn.	Rubiaceae	do	See Cansilan.
Cantutay, Tag.			Roots and leaves.	Both bark and leaves are brewed into a decoction; that of the former is taken as an emetic, and that of the latter is used in baths for its antirheumatic action.
Canumay.	<i>Canapistula</i> , Pamp., Tag.			See Canomoy.
Canapistula, Pamp., Tag.				See Balayong.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Capacapa, Iloc				See Cabcab.
Capal capal, Tag.	<i>Calotropis gigantea</i> R. Br.	Asclepiadaceae	Bark and inspissated latex.	Used as alterative in certain diseases of the skin; also have vermifuge properties.
Capanatutlot, Tag.				See Bunlao.
Capanitutlot, Tag.				Do.
Capayas, Vis	<i>Carica papaya</i> Linn.	Caricaceae	Outer part of the root.	The decoction is digestive and tonic, much used against dyspepsia.
Capili, Tag.				See Botong
Capintutlot				See Andarayan.
Capoe, so called in Mindanao.				See Bubuy.
Carachuche, Tag.				See Calachuche.
Carambuaya, Iloc.				See Bait.
Carangcang, Vis				See Calangcang.
Caritana, Vis				See Angélico.
Caró, Ibanag				See Agohó.
Carot, Vis				See Calut.
Carugu., Tag, Vis				See Anis Cahoy.
Carupl, Vis				See Balicbalic, Pamp.
Casabang, Iloc				See Baga tambal.
Casabhá, Vis				See Biri.
Casindig, Tag				See Cabrab.
Casirag, Vis				See Calampinay.
Casitas, Vis				See Acapulco.
Caslá, Vis	<i>Jatropha curcas</i> Linn.	Euphorbiaceae	Seeds and leaves.	The oil is a drastic purgative and the decoction of the leaves is a good antidiarrhetic.
Casopanñil, Tag.				See Alocasoc.
Casoy, Vis				See Ralubat.
Castiocastiogan, Tag.	<i>Hibiscus abelmoschus</i> Linn.	Malvaceae	Roots, leaves, and seeds.	The seeds after being pounded and prepared in decoction, are administered as diuretic tonic and carminative the mucilaginous decoction of the root and leaves is used in gonorrhea; the seeds are also antihysterie.
Castocastolian, Pamp.				See Castiocastiogan.
Castuli, Tag				Do.
Casubhá, Tag., Pamp., and Vis.				See Biri.
Casubhangaso, Iloc.				See Diliwarío.
Casubsuban, Pamp.	<i>Polygonum barbatum</i> Linn.	Polygonaceae	Sap of the leaves.	The sap of the pounded leaves directly applied to wounds is vulnerary.
Casuy, Tag				See Balubat.
Catacatacá, Tag				See Angélico.
Catandá, Tag.				See Acapulco.
Catandangaso, Tag.				See Bahó-bahó.
Catáng catáng, Tag.				See Arodayday.
Catalonga, Vis				See Canlará.
Catchibong, Vis	<i>Datura alba</i> Nees ab Es.	Solonaceae	Roots, leaves, and seeds.	The leaves are mordant; a narcotic much used in resolutive and mitigant poultices; it is also smoked like stramonium in cases of dyspnea produced by asthma; the seeds and roots have the same applications; sometimes they are used for criminal purposes; the Moros are said to intoxicate themselves with this plant before they commit their massacres.
Catchubung, Vis				See Catchibong.



*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Caticot, Vis.....	<i>Capsicum minimum</i> Roxb.	Solonaceae .....	Fruit .....	Used as revulsive.
Catiquis, Tag., of Bataan.	<i>Cupania pleura-</i> <i>pteris</i> Blume ( <i>Schlechera</i> <i>subundulata</i> <i>Turez?</i> ).	Sapindaceae .....	Roots .....	The decoction of this root is considered anti- periodic like the cin- chona bark.
Catmón, Tag .....	<i>Dillenia phil-</i> <i>ippinensis</i> Rolle.	Dilleniaceae .....	Fruit .....	The acid juice is em- ployed as a fluidific- ant and also to cleans the hair.
Catunday, Tag....	<i>Sesbania gran-</i> <i>diflora</i> Pers.	Leguminosae .....	Bark, leaves, and flowers.	The bark is tonic; the leaves are purgative; the flowers are anti- hemigranic when their fragrance is in- haled through the nostrils.
Catuit, Tag .....	<i>Euphorbia tiru-</i> <i>calli</i> Linn.	Euphorbiaceae .....	Stems and latex.	The stems are used in poultices to consoli- date fractures of the bones, and the latex as an energetic revul- sive.
Catungál, Tag....				See Abud.
Caturay, Tag., Pamp.				See Catunday.
Caumpang, Vis....				See Bangar.
Caon, Tag .....				See Anibung.
Caupi, Vis .....				See Balic balic, Pamp.
Caway, Vis .....				See Baigil.
Cawayan totoo, Tag.	<i>Bambusa arun-</i> <i>dinacea</i> Retz.	Cramineae .....	Roots .....	Its decoction is adminis- tered in cases of anury or anuresis.
Cawilan, Tag....				See Caguindi.
Cayanga, Tag., Vis., Pamp.				See Antolangan.
Cayangeang, Vis.				See Calangeang.
Cayaoyao, Tag., Vis. of Samar.	<i>Alstonia specta-</i> <i>bilis</i> Br.	Apocynaceae .....	Bark .....	The same uses as the bark of <i>Andarayan</i> ( <i>Alstonia scholaris</i> , Br.)
Cayaoyao, Tag....	<i>Echites tritida</i> Blanco.	.....do .....	Roots and bark..	Emmenagogue if taken in decoction.
Caycay, Tag .....	<i>Adiantum lunu-</i> <i>latum</i> , Burm.	Filices .....	Fronds .....	Used either in decoction or sirup for the same purposes as the <i>Adiantum capillus</i> <i>veneris</i> in European therapeutics; in the Islands they are ad- ministered to women in childbirth in the same manner as the <i>Aristolochias</i> .
Cayutana, Tag....				See Gayutana.
Cayutana, Tag....	<i>Zanthoxylum</i> <i>oxyphyllum</i> Edgew.	Rutaceae .....	Roots and bark of the trunk.	Febrifuge, tonic, and emmenagogue when administered in form of decoction.
Cayutana, Tag., Pamp.				See Baga tambal.
Cebollas albarana, corruption of the Spanish word albarana wrongly ap- plied to this plant in Visayas.	<i>Sisyrinchium</i> <i>palmifolium</i> Linn.	Iridaceae .....	Bulbs .....	The bulbs are diuretic when prepared into a poultice or when brewed into a decoc- tion for internal use.
Cebollas de Per- sia, so called in Manila.				See Cebollas albarana.
Cha-chahan, so called in Ma- nila and sur- roundings.	<i>Ehretia buxifo-</i> <i>lia</i> Roxb.	Borraginaceae .....	Leaves .....	Infusion is taken as tea.
Chachanhan, Tag.	<i>Lippia nodiflora</i> Rich.	Verbenaceae .....	Leaves and tops ..	An infusion of the leaves and tops in the form of tea is em- ployed by the Filipi- nos as a carminative and diuretic remedy.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Chachachachahan, Tag.	Scoparia dulcis Linn.	Scrophulariaceae	Leaves and tops	Its infusion is used like tea in certain affections of the intestines.
Champaca, so called in Manila.	Michelia champaca Linn.	Magnoliaceae	Roots, bark, and flowers.	The root is an emmenagogue; the bark has febrifuge properties; the flowers are diuretic and are used in gonorrhea to relieve scalding.
Chanchauchauchauan, Tag.	Canseora diffusa R. Br.	Gentianaceae	Entire plant	See Calaad.
Chang bató, Tag.				Administered in the form of decoction; it is tonic and antigestralgic.
Chichirica, Manila.	Vinea rosea Linn.	Aphocnaceae	Roots	Commonly believed to be emmenagogue.
Chico, so called throughout the Archipelago.	Achras sapota Linn.	Sapotaceae	Lates	Used as astringent in the cure of aphtoes.
(?)	Chloranthus officinalis Bl.	Choranthaceae	Roots	Used in decoction as an efficient sudorific in fevers.
Cinamomo, so called in Manila and other parts.	Lawsonia alba Lam.	Lythraceae	Leaves	Antitherpetic; rarely used.
Cinco llagas, Sp.-Fil. and Tag.	Eranthemum ricolor Schrank.	Acanthaceae	Roots, stem, and leaves.	Used in decoction to cure aphtoes, and also useful in healing wounds, ulcers, etc.
Cinco llagas, Iloc.	Imperata arundinacea Cyr.	Cramineae	Ears	See Sapin sapin.
Cobamba, Tag.				See Chang bató.
Cogon, Vis., Pamp., etc.				Vulnerary in decoction and sedative when taken internally.
Cola, Tag.				See Camaog.
Colang bundoc, Tag.				Do.
Colasiman, Tag.	Rhabdialycoides M. rt.	Borraginaceae	Stems	See Ausiman.
Colatay, Tag.	Aristolochia sp.	Aristolochiaceae	Roots	Used in decoction as sudorific and diuretic.
Colaya, Vis.	Pisonia grandis R. Br. (Cordia? olitoria Blanco).	Myrtaginaceae	Leaves	Tonic, carminative, and emmenagogue.
Coles maluco, Tag.				The leaves cooked are considered to be highly efficient for the healing of inveterate ulcers.
Colintasan, Vis.	Clitoria ternatea Linn.	Leguminosae	Roots and seeds	See Cacuentasan.
Colis, Tag.				See Candon.
Colocanting, Tag.				The root produces vomiting and it is administered to children with coughs; it is also diuretic. The seeds are purgative.
Colocogo, Vis.	Ocimum gratissimum Linn.	Labiatae	Roots, leaves, and seeds.	See Albahaca.
Colocogo, Vis.				The decoction brewed from the root and leaves is specific for gonorrhea; externally it is used in baths to cure rheumatic pains and paralysis; the decoction obtained from the seeds is demulcent.
Colocolog, Vis.	Waltheria indica Linn.	Sterculiaceae	Leaves	See Alocaosoc.
Col-locol-lot a mala бага, Iloc.				Emollient in decoction.
	Comelyna nudiflora Linn.	Commelinaceae	Entire plant	Used in decoction as collyrium in ophthalmia.
Condol, Tag.	Benincasa cerifera Savl.	Curcubitaceae	Fresh fruit	Made into sirup it is generally administered in all disorders of the respiratory organs.
Copetes, Tag.				See Ahito.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Corason de angel, Vicol.	<i>Tacca palmata</i> Blume.	Taceaceae	Tubercles	The fillings are used internally to cure certain gastric complaints.
Corot, Vis				See Calut.
Cosol, Vis				See Abud.
Cosol cosol, Vis	<i>Monochoria hastata</i> Presl.	Pontederiaceae	Roots and leaves	They have caustic properties and are employed externally pounded, as a rubefacient in rheumatism; the roots pounded and mixed with oil are said to be useful in the treatment of anthrax; the faded leaves in warm water are used in topicals applied on the chest and back of asthmatics in order to dissipate the dyspnea.
Coting cotingan, Tag.				See Cabra cabra.
(?)	<i>Crotalaria sericea</i> Retz.	Leguminosae		The same properties as the Gurung-gurung.
Crus-crusan, Tag	<i>Parmentiera alata</i> Miers.	Bignoniaceae	Leaves	The decoction of the leaves is astringent and antihemorrhagic; much used in hemophthisis and dysentery.
Cuacuacohan, Tag.	<i>Abutilon indicum</i> Don.	Malvaceae	do	Yield an emollient decoction.
Cuanton, Iloc				See Ayantoto.
Cucung manoc, Tag.	<i>Barleria prionitis</i> Linn.	Acanthaceae	Leaves and tops	The decoction is used for bathing in cases of febrile catarrhs.
Cucum cucum?, Vis.				See Albahaca, Vis.
Culalao, Iloc				See Angay.
Culantà, Tag				See Cucung manoc.
Culantrillo, so called in the vicinity of Manila and in Pampanga.				See Caycay.
Culantro, Manila.	<i>Coriandrum sativum</i> Linn.	Umbelliferae	Fruit	The infusion is used to cure dyspepsia; pounded it is inhaled to dissipate giddiness.
Culasi, Tag	<i>Lumnitzera racemosa</i> Willd.	Combretaceae	Oleoresin or resinous gum.	The fluid substance which is obtained from incisions made in the stem is employed mixed with coconut oil, as antihyperic and antiscabious.
Culatay, Pamp				See Campupot.
Culetes, Vis				See Ayantoto.
Culiao, Iloc., and Ibanag.				See Angay.
Culit, Tag., Vis.				See Anino.
Culitan, Tag., Vis., and Pamp.	<i>Urena sinuata</i> Linn.	Malvaceae	Roots and leaves.	Emollient when prepared as decoction.
Culitan bilog, Tag.	<i>Triumfetta rhomboida</i> Jacq.	Tiliaceae	do	Emollient and used in the same cases as the urena abutilon, etc.
Culuteculutan, Tag., Vis., and Pamp.				See Culutan.
Culot pamo, Pamp.				See Caguindi.
Cungl, Pamp				See Ayo.
Cunig, Iloc, and Ibanag.				See Angay.
Cunti, Tag				See Bolagto.
Cupang cupangan, Tag.	<i>Caesalpinia nuga</i> Ait.	Leguminosae	Leaves	Used in decoction in the treatment of obstinate ophthalmia.
Cupit cupit, Iloc				See Bato bato.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Curibetey, Pamp				See Alibutbut.
Curibuetruet, Iloc				Do.
Cuscusipa, Iloc				See Calaad.
Cusiben, Iloc				See Catiquis.
Cusnao, Iloc				See Angay.
Cusol, Pamp., Vis.	Kaempferia galanga Linn.	Zingiberaceae	Rhizomae	Carminative if used in decoction, and chewed they are useful in alleviating cough. Pounded they are useful in curing the irritation produced by contact with certain caterpillars.
Cusung, Pamp				See Mutha.
(?)	Cyanotis axillaris Roem. et Shult.	Commelinaceae	Entire plant.	Has the same properties as the Alicbañgon and the same vulgar synonym.
Dagamiit, Vis	Rubus moluccanus Linn.	Rosaceae	Roots and stem	Depurative in decoction; much like sarsaparilla.
Dail, Pang	Tylophora asthmatica W. et A.	Asclepiadaceae	Roots	Substitute for ipecacuanha in all its uses; also considered as emmenagogue and effective specific for colic.
Daila, Vis				See Amulong.
Dairiangao, Tag				See Adaan.
Daitanag, Pamp				See Apalit.
Dalandon, Vis				See Calayate.
Dalao, Iloc				See Bueng.
Dalipaco, Iloc				See Caycay.
Dalipawen, Iloc				See Andarayan.
Dalisay, so called in many parts of the Islands.				See Banilac.
Dalucduc, Iloc. of Abra.				See Amor seco.
Dalugdug	Caesalpinia bonducella Fleming.	Leguminosae	Seeds	Administered in form of powder as febrifuge and tonic.
Dalupang, Tag				See Castiocastongan.
Dalupang, Vis				See Oulutan.
Damong hiya, Tag.	Biophytum sensitivum DC.	Oxalidaceae	Plant, roots, and leaves.	Placed under the pillow, the leaves are reputed to act as soporific; the seeds are vulnerary when applied in the form of powder; the roots in decoction are administered in cases of gonorrhea and lithiasis.
Damong maria, Tag.				See Ca maria.
Damong pallas, Tag.	Ageratum conyzoides Linn.	Compositae	Leaves	Pounded and mixed with salt they are a very effective vulnerary.
Damoro, Tag	Carum copticum Benth.	Umbelliferae	Fruits	Employed together with buyo for chewing when carminative effects are desired.
Dancalan, Tag., Vis., Vicol.				See Bitanhol.
Dangla, Iloc., Vis.	Vitex negundo Linn.	Verbenaceae	Bark, tops, and leaves.	The decoction is anti-gastralgic; the leaves are used in aromatic baths; also as insectifuge.
Dapdap, Tag., Vis., Pamp.				See Cabrab.
Dapedape, Tag				Do.
Daponaya, Vis				See Badiara.
Darang, Vis				See Ayo.
Daraput, Vis	Samadera indica Gaertn.	Simarubaceae	Bark and wood	Febrifuge, tonic, stomachic and emmenagogue.
Datiles, Tag	Muntingia calabura Linn.	Elaeocarpaceae	Flowers	Used in infusion in the same manner as Tilia europaea.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Daucagi, Vis.				See Canlará.
Dausum, Vis.				See Abud.
Dawag, Tag.	Capparis horrida Linn. f.	Capparidaceae	Tops and buds.	Used as counterirritant.
Dayap, Tag.	Citrus medica Linn; Var. acida H. f.	Rutaceae	Bark and fruit.	The decoction of the bark is said to dissipate intoxication.
Dilang buaya, Vis.	Aloe sp.?		Leaves	The viscous sap of the leaves is employed by women as a remedy to prevent the loss of hair.
Dilang butiqui, Tag.				See Ayo.
Dilang halo, Vis.				See Dilang buaya.
Dilang usá, Tag.	Trichodesma zeylanicum Br.	Borraginaceae	Flowers	Employed by natives instead of the flowers of the Boraco officinalis of commerce.
Dilang usá, Tag.				See Ardatag.
Dilao, Tag.				See Añgay.
Diliwario, so called in Manila.	Argemone mexicana Linn.	Papaveraceae	Flowers, seeds, and latex.	The flowers are used in infusion as sedative in cough; the seeds yield a lacteal fluid which is considered purgative if taken in small doses; the latex is further used to destroy warts and also to promote the healing of indolent ulcers.
Dincalin, Tag.				See Bitanhol.
Dinglas (?) Tag.	Terminalia sp.	Combretaceae	Fruit	Astringent used in decoction to cure aphthos and obstinate diarrhea.
(?)	Dischidia collyris Wall.	Asclepiadaceae	Leaves	Charred and mixed with oil they are efficacious in healing obstinate ulcers.
Dita, Tag.				See Andarayan.
Doao, Vis.				See Añgay.
Docot docot, Tag.				See Angud.
Docot docot, Vis.	Desmodium gangeticum DC.	Leguminosae	Leaves and tops.	In decoction it is febrifuge; employed internally or externally in baths.
Doloariw, Tag.	Acanthus ilicifolius Linn.	Acanthaceae	Roots and leaves.	The decoction of the root is antiasthmatic and that of the leaves is considered emollient.
Doldol, Vis.				See Bubuy.
Dol, Vis.				See Balongay.
(?)	Drosera peltata Linn. (?)	Droseraceae	Leaves	Rubefacient; used sometimes in catarrhal fever or when an efficacious revulsive is wanted.
Duat, Tag., Pamp., Vis.	Eugenia jambolana Lam.	Myrtaceae	Bark, leaves, and seeds.	The bark in decoction is astringent; the leaves steeped in alcohol and the seeds when pulverized are used in diabetes.
Dugtung ahas, Tag.				See Bulao bulao.
	Streptocaulon baumii Decne. Parameria philippinensis Radlk.	Asclepiadaceae	Latex	Very effective cicatrizant of fresh wounds.
Ducum, Vis.				See Castiocastogan.
Duguan, Tag., Vis.				See Anis cahoy.
Duha, Vis.				See Busain.
Duhát, Tag., Pamp., Vis.				See Duat.
Dulao, Vis.				See Añgay.
Dulawary, Pamp.				See Doloariw.
Dulupang, Vis.				See Cuacucohan.
Dumanay, Tag.				See Agoy oy.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Dumero, Tag.	Rosmarinus officinalis Linn.	Labiatae	Leaves and tops	Used in the same manner as in European therapeutics.
Dura, Vis.	Ruta graveolens Linn.	Rutaceae	do	Administered in large doses they are emmenagogue and abortive. Also used as antispasmodic and stimulant; they are further prescribed in hysteria.
Durugu, Tag., Vis.				See Anis cahoy.
Duso, Tag.				See Cusol.
Dusod, Tag.				Do.
Dusog, Tag.				Do.
Dusol, Pamp., Vis.				Do.
(?)	Elephantopus scaber Linn.	Compositae	Roots and leaves	In the form of decoction they are diuretic, febrifuge and emollient.
(?)	Enydra fluctuans Lour.	do	Leaves	Pressed they are applied to the skin in cure certain herpetic eruptions.
Escobang bilog, Tag.	Sida rhombifolia Linn.	Malvaceae	Roots and leaves	Emollient when used in decoction.
Escobang haba, Tag., Vis., and Pamp.	Sida carpinifolia Linn.	do	do	Emollient in decoction and internally taken is a specific against hemorrhoids, fevers, and impotency, and is a general tonic. Also demulcent and diuretic, used in gonorrhea and rheumatism.
(?)	Euphorbia thy-mifolia Burm.	Euphorbiaceae	Entire plant	The leaves are employed commonly in poultices to counteract the deleterious effects of bites of poisonous snakes, and also as an efficient vulnerary; the latex is sometimes used to dissipate the opacity of the cornea.
(?)	Evolvulus alsinoides Linn.	Convolvulaceae	do	Used in infusion to cure certain irregularities of the bowels; it is also vermifuge and febrifuge.
(?)	Exacum tetragonum Roxb.	Gentianaceae	do	Used in infusion as a mild tonic and emmenagogue.
(?)	Fagraea fragrans Roxb.	Loganiaceae	Bark	Used as febrifuge especially in agues.
(?)	Ficus gibbosa Blume.	Moraceae	do	Used in decoction as an aperient.
Flores de las doce, so called in many parts of the Islands.	Pentapetes phoenicea Linn.	Sterculiaceae	Fruit	Emollient in decoction.
Flores de S. Antonio, Manila.	Tabernaemontana coronaria Br.	Apocynaceae	Roots and latex	When mixed with oil they are vulnerary.
Flores de S. Antonio, so called in some parts of Manila.				See Bastón de San José.
(?)	Flueggea microcarpa Blume.	Euphorbiaceae	Bark	Poisonous, used in fishing; it contains an alkaloid worth further study.
Gabi gabilan, Tag.				See Cosol cosol.
Gabi gabilan, Tag.	Typhonium divaricatum Decaisne.	Araceae	Tubercles	Rubefacient; very rarely used.
Gabing uac, Tag.				See Apayao.
Gabuen, Vis.				See Alibun.
Gabut gabut, Iloc.	Eleusine indica Gaertn.	Eleusine indica Gaertn.	Entire plant	Used mixed with gogo to cleanse the head from scurf and to prevent loss of hair.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Galamay amo, Tag., Vis.				See Calangcang.
Galiang, Vis.	Alocasia sp.	Araceae	Spadix	The petioles are full of small tubercles; used in decoction as emmenagogue and ec-bolic.
Galonapas, Pamp.				See Muthá.
Gamagamatisan, Tag.				See Bolagtob.
Gamot sa buni, Tag.				See Acapulco.
Gamot sambali, Tag.				See Bulao bulao.
Gapas gapas, Vis.				See Danglá.
Garañgan, Vis.				See Balmbing.
Garban, Vis.				See Amulong.
(?)	Garcinia morella Desrouss.	Guttiferae	Resinous gum	A drastic purgative known in therapeutics.
Gatas gatas, Tag., Vis.				See Batotonis.
Gaway gaway, Vis.				See Catuday.
Gayos, Vis.				See Calut.
Gayunang ma- noc, Tag.				See Caycay.
Ginabang, Iloc.				See Bilang.
Goan Goan, Vis.				See Aetan.
Gogong bacay, Vis.				See Balogo.
Golondrina, Tag.				See Batobatonis.
Gomamela, Tag., Vis., Pamp., etc.				See Antolangan.
Gona, Pamp.				See Cabcab.
Grana				See Alugbati.
Granado, so called throughout the Islands.	Punica granat- um Linn.	Punicaceae	Bark of the root	Vermifuge.
(?)	Grangea mader- aspata n a Poir.	Compositae	Leaves	In infusion they are stomachic and anti-spasmodic.
(?)	Grewia tilefolia Vahl.	Tiliaceae	Bark	Steeped in water and subjected to pressure the bark yields a mucilage which is administered in dysentery.
Gugo, Tag.				See Balogo.
Gugulangin, Tag.		(?)	Bark	In decoction taken as antispasmodic.
Guicos-guicos, Tag.				See Camagsa taquillis.
Guicos-guicos, Vis.				See Agiayangyang.
Guilalas, Tag.	Mirabilis jalapa Linn.	Nictaginaceae	Leaves	Used cooked in poultice to cure the urticaria produced by a bad digestion.
Gulling-guiling- gan.				See Cuacuacohan.
Guintin-guintin, Vis.				See Alibun.
Guisol, Tag., Vis., Pamp.				See Cusol.
Guison, Vis.				See Bañgil.
Guiti sang hari, Vis.	Rhaco discolor Hance.	Commelinaceae	Leaves	The leaves fresh or roasted are used as emollient.
Guiti sang reina, Vis.				See Guiti sang hari.
Gulaman, Tag.	Gracilaria liche- noides Grev.	Algae	Gelatine	The gelatine extracted from this weed is used by the Filipinos as pectoral and anti-dysenteric.
Gurung gurung, Vis.	Crotalaria retu- sa Linn.	Leguminosae	Leaves	In decoction they are antibilious, emollient and known to diminish the secretion of the saliva.
Guyabas, so called in Manila.				See Bayabas.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
(?) -----	<i>Gynandropsis pentaphylla</i> , DC. (It has the same common names as the <i>Cleome viscosa</i> Linn.)	Capparidaceae	Leaves and seeds	The leaves are used externally like the seeds of mustard and taken internally in certain bilious disorders; the seeds have similar properties as those of mustard.
Habas, Tag. of Batangas.	<i>Canavalia ensiformis</i> DC.	Leguminosae	Seeds -----	The seeds are applied in topicals on fresh hernias
Habul, Vis	-----	-----	-----	See Ardatag.
Hagachuac, so called in Leyte.	-----	-----	-----	See Balao.
Hagonoy, Tag., Vis.	-----	-----	-----	See Agonoi.
Haguimit, Vis.	-----	-----	-----	See Aimit.
Halon, Tag	<i>Morinda tinctoria</i> Roxb.	Rubiaceae	Bark -----	Employed in powder to cure diarrheas and agues.
Hamamale, Vis.	-----	-----	-----	See Amamale.
Hamintago, Vis	-----	-----	-----	See Bitnong.
Hamitanago, Vis	-----	-----	-----	Do.
Hamlihon, Vis	-----	-----	-----	See Alibun.
Hampapare, Vis.	-----	-----	-----	See Calaad.
Hampas tigbalang, Tag.	<i>Smilax blancoi</i> Kunth.	Libiaceae	Roots and rhizomae.	Depurative in decoction.
Hamuraon, Tag	-----	-----	-----	See Bulaon.
Hangod, Tag	-----	-----	-----	See Angud.
Hangor, Tag., Vis.	-----	-----	-----	Do.
Hanmababao, Pamp., Vis.	-----	-----	-----	See Camagsat taquilis.
Harangan, Tag., Vis.	<i>Centipeda orbicularis</i> Lour.	Compositae	Leaves -----	Squeezed between the fingers and inhaled they clear the head by producing sneezing.
(?) -----	<i>Harpullia cupanoides</i> Roxb.	Sapindaceae	Bark and oil of the seeds.	The bark contains an active substance which stuns fish and kills them. The oil is sometimes used as antirheumatic.
Harum, Vis	-----	-----	-----	See Ayantoto.
Hawili, Tag	<i>Ficus leucantoma</i> Poir.	Moraceae	Leaves and latex.	The leaves used in topicals relieve rheumatic pains, and the caustic properties of the latex are antihypertic.
(?) -----	<i>Helicteres isora</i> Linn.	Sterculiaceae	Roots -----	Emollient in decoction.
(?) -----	<i>Hemidesmus indicus</i> R. Br.	Asclepiadaceae	do -----	Given in the form of decoction as antisyphilitic, generally as alterative and tonic.
Hibi hibihaan, Tag.	-----	-----	-----	See Chachachachahan.
Hibioc, Vis	-----	-----	-----	See Anibung.
(?) -----	<i>Hibiscus esculentus</i> Linn.	Malvaceae	Fruit -----	Cultivated in gardens; a mucilaginous sirup is made of them; useful in sore throat attended with hoarseness.
Hidloc, Vis	-----	-----	-----	See Anibung.
Higotbalato, Tag.	-----	-----	-----	See Escobang haba.
Higuil manoc, Tag.	<i>Eclipta erecta</i> Linn.	Compositae	Leaves and tops	Brewed into decoction it is given internally as a deobstruent in cases of hepatitis; pounded, they are used for healing wounds.
Himbabao, Vis	-----	-----	-----	See Alipata.
Himpapare	-----	-----	-----	See Calaad.
Hincamas, Tag., of the vicinities of Manila.	<i>Pachyrrhizus angulatus</i> Rich.	Leguminosae	Tuberous roots.	The sap is used as a collyrium with persons attacked by confluent smallpox; the leaves of this plant pressed are useful to destroy vermin in dogs.



## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Hindurugu, Tag., Vis.				See Anis cahoy.
Hingasin, Vis	<i>Derris uliginosa</i> Benth.	Leguminosae	Bark	Useful to poison fish; used also as antirheu- matic when cooked with oil and mixed with other excitant remedies.
Hingasinan, Vis				See Hingasin.
Hinacaoayan, Vis				See Alicbañgon.
Hinguio, Tag	<i>Ichnocarpus</i> <i>frutescens</i> R. Br.	Apocynaceae	Roots	Brewed into a decoction it acts as depurative of the blood in syphilitic, venereal, or herpetic diseases.
Hinlalayón, Tag				See Cabra cabra.
Hipguid, Vis				See Hinguio.
Hitam, Vis				See Banilac.
Hoag, Vis				See Arayan.
Hoja cruz, Sp. Fil.				See Crus crusan.
Homay homay, Vis.				See Balangot.
Horog, Vis				See Amulong.
Hoya hoya, Vis				See Damonñ hiya.
Huac, Vis				See Arayan.
Hulaya sang ayan.				See Apuy apuyan.
Huliñgaña, Tag	<i>Hymenodictyon</i> <i>excelsum</i> Wall.	Rubiaceae	Bark	Used as substitute for cinchona bark in its antiperiodic and tonic effects.
Huya huya, Vis	<i>Mimosa pudica</i> Linn.	Leguminosae	Entire plant	Alternative in decoction.
Huya huya, Vis				See Damonñ hiya.
Iba, Tag., Vis				See Banquiling.
Iba, Vis				See Calamias.
Ibabao, Vis				See Balayong.
Ibaybaquir, Iloc				See Alugbati.
Ibioc, Vis				See Anibung.
Idioc, Vis				Do.
Icog icog, Sang cuti, Vis				See Caba cabra.
Igasúd, Vis				See Canlará.
Iguin, Tag				See Agulu.
Ihito, Vis				See Ahito.
Ingonas, Iloc				See Lampuyan.
Ipil ipilan, Tag				See Aghó.
(?)	<i>Ipomoea uni-</i> <i>flora</i> Roem. et Sch.	Convulvulaceae	Leaves	Taken in form of decoction in dyspepsia.
Iroc, so called in Zambales.				See Anibung.
Itang Itang, Vis				See Cayutana.
Itiban, Tag				See Bulao bulao.
Itmó, Tag., Vicol				See Buyo.
(?)	<i>Kaempferia ro-</i> <i>tunda</i> Linn.	Zingiberaceae	Rhizomae	Used internally in gastric complaints like the galanga sp., and externally are a powerful cicatrizant and resolvent if mixed with coconut oil.
(?)	<i>Kandelia rhe-</i> <i>dii</i> W. et A.	Rhizophoraceae	Bark	Astringent in decoction.
Jicara, Sp. Fil				See Crus crusan.
(?)	<i>Justicia procum-</i> <i>bens</i> Linn.	Acanthaceae	Leaves	Used as astringent externally in the cure of certain eruptions of the skin.
Labanos, a cor- ruption of the Spanish word rávanos.	<i>Rhaphanus sati-</i> <i>vus</i> Linn.	Cruciferae	Leaves and seeds	The seeds and leaves are diuretic and lithontriptic.
Labong, Vis				See Anabó.
Lacad bulan, Vis				See Alibun.
Lacdanbulan, Vis				Do.
Lactang, Tag., Pamp., Vis.				See Abuta.
Lagayray, Tag				See Arodayday.
Lagini, Vis				See Caguindi.
Lago, Tag				See Biri.

*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Lagolo, Tag -----	<i>Acrostichum aureum</i> Linn.	Filices -----	Rhizomæ and leaves.	The rhizomæ are vulnerary and are especially used in healing inveterate ulcers; the leaves used in topicals are emollient.
Lagpacum, Vis -----				See Bolagto.
Laguino, Vis -----				See Dawag.
Laguis laguis, Tag -----				See Doloariw.
Lagundi, Tag., Pamp., Vis. -----				See Dangla.
Lagunding ga-pang.				See Agubara.
Lalacdan.				See Alibun.
Lambayong, Iloc -----				See Arodayday.
Lamhay, Vis -----	<i>Corchorus capsularis</i> Linn.	Tiliaceæ -----	Seeds -----	Used as tonic, carminative and febrifuge, either in powder or decoction.
Lamot lamotan, Tag.				See Caycay.
Lampacanay, Vis -----				See Balangot.
Lampuyang, Vis -----	<i>Zingiber zerumbet</i> Roscoe.	Zingiberaceæ -----	Rhizome -----	Used in decoction as carminative and when prepared with oil as an antirheumatic.
Lamudio, Tag. and Vis.				See Damoro.
Lancolas, Pamp., Vis.				See Bagombong.
Lancoas, Vis -----				Do.
Laña, Iloc -----				See Laña.
Laña, Ibanag -----	<i>Sesamum indicum</i> Linn.	Pedaliaceæ -----	Seeds -----	Antirheumatic if used with massage.
Langca, Tag., Vis.	<i>Artocarpus integrifolia</i> Willd.	Moraceæ -----	Leaves -----	Charred and pulverized they are applied to wounds for their healing properties.
Langcauas, Vis.				See Bagombong.
Langcouas, Vis., Pamp.				Do.
Langcuas sing halo.				See Lampuyang.
Lañggas, Vis -----				See Alagas.
Lañgñgi, Vis -----				See Caguindi.
Lañgda, Vis -----				See Calantás.
Lañgpa, Vis -----				Do.
Lanta, Tag., Pamp., Vis.				See Abuta.
Lantid, Tag. (corruption of the Spanish word lanten).	<i>Plantago major</i> Linn.	Plantaginaceæ -----	Leaves -----	In decoction it is used as emollient.
Laponaya, Vis -----				See Badiara.
Lara-lara, Vis -----			Leaves -----	Unknown; used to poison fish.
Larawan anito, Tag.				See Allocasoc.
Lasuna, Tag -----	<i>Allium cepa</i> Linn.	Libiaceæ -----	Bulbs -----	Cooked and mixed with coconut oil they are used in the form of ointment and applied on the abdomen to provoke diuresis.
Lauat, Vis -----	<i>Litsea sebifera</i> Pers?.	Lauraceæ -----	Bark -----	Used in decoction to cure intestinal catarrhs.
Layohan, Vis -----				See Banquiling.
Lengua de perro, so called in Manila.				See Balt.
(?) -----	<i>Lepidium rudemale</i> Linn.	Cruciferae -----	Leaves -----	Administered in infusion in fevers.
Libas, Iloc -----	<i>Modecca trilobata</i> Roxb.	Passifloraceæ -----	Wood -----	When macerated, lather is used for washing in cases of skin irritation or eruption.
Libato, Tag -----				See Alugbati.
Libay, Tag -----				See Angud.
Libotbot, Vis -----				See Alibutbut.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Libun, Vis-----	<i>Emilia sonchifolia</i> DC.	Compositae-----	Leaves-----	Used as a decoction they have proved very efficacious in all cases of fever; they are also useful in combating infantile tympanites. See Abuta.
Lictang, Tag., Pamp., Vis.				See Camiring.
Ligas, Tag-----				See Cantutay.
Lilitan, Vis-----				See Calangcang.
Lima lima, Tag., Vis., Pamp.				See Cinco llagas.
Limañg sugat, Tag.				
(?)-----	<i>Limnophila gratioides</i> R. Sr.	Scrophulariaceae.	Leaves-----	The infusion of the leaves is used to cure dysentery and dyspepsia.
Linaton anac-----				See Daraput.
(?)-----	<i>Lindenbergia urticaefolia</i> Lehm.	do-----	do-----	The sap is used to cure bronchitis, and employed externally it is used to combat dermatosis.
Lifga, Tag-----				See Laniga.
Lifgasina, Tag---	<i>Ricinus communis</i> Linn.	Euphorbiaceae	Leaves and seeds	The leaves are used fresh and whole externally in headache and the seeds are purgative and antirheumatic.
Lifgat, Tag-----	<i>Begonia rhombicarpa</i> A. DC.	Begoniaceae-----	Leaves-----	Brewed into a decoction and sweetened they yield a refreshing beverage in fevers.
Lingatong, Vis---				See Apariagua.
Lino, Tag., Vis---				See Ahino.
Linog, so called in Zambales.				See Bocaboc.
Lintang baguing, Tag., Pamp., Vis.				See Abuta.
Lintong gamai, Vis.				See Dunaput.
Lipa, Tag-----				See Apariagua.
Lipang doton, Pamp.				Do.
Lipata, Vis-----				See Alipata.
Lipay, Tag-----				See Apariagua.
Lipay, Tag., Vis---				See Nipay.
Lipay, Vis-----	<i>Mucuna monoperma</i> DC.	Leguminosae-----	Fruit-----	Known to be useful in asthma and stubborn coughs.
Lipay, Tag., Vis---	<i>Mucuna pruriens</i> DC.	do-----	Roots, leaves, and seeds.	The root in infusion is useful for diarrheas, and in cases of anury the leaves are vulnerary and the seeds aphrodisis.
Lirio, so called in Manila.				See Agubahan.
Do-----				See Abanico.
Lisangay, so called in Zam- bales.				See Angay.
Lobi, Vis-----	<i>Cocos nucifera</i> Linn.	Palmae-----	Almost every part of the plant.	This plant, besides its many medicinal uses, gives an empyrheumatic resin used generally in odontalgia caused by caries, and cutaneous diseases; it is obtained by burning the endocarp in a receptacle and condensing in another the volatile products which separate.
Loco loco, Tag---				See Albahaca.
Loco loco, Vis---				See Banghansit.
Loco loco, Pamp., Vis.				See Colocogo.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Lombayang, Vis.				See Balayong.
Lomboy, Tag.,				See Duat.
Pamp., Vis.				
Lonoc, Vis.				See Baliti (ficus concinna, Miq.).
Lubban, Ibanag.				See Lucban.
Lubigan, Tag.,				See Bueng.
Vis.				
Lubi lubi, Vis.				See Balagto.
Do				See Camaog.
Lucban, Tag.,	Citrus decumana Linn.	Rutaceae	Leaves, flowers, and pericarp.	Employed in the form of decoction or infusion as sedative in nervous affections.
Ibanag, Abra,				See Cabcab.
Ilocano.				
Lucot lucot, so called in Misamis.				Do.
Do				See Banilac.
Lugo, Iloc				Used as hemostatic and cicatrizing.
Lugug, Tag.	Arenga saccharifera Lab.	Palmaceae	The down of the petioles.	See Bagulumbang and Lumbang, Tag.
Lumbang, Vis.				Yield a mild purgative oil.
Lumbang, Tag.	Aleurites molucana Willd.	Euphorbiaceae	Seeds	See Duat.
Lumboy, Tag.,				See Dugtong ahas (parameira).
Pamp., Vis.				See Cacaocacaoan.
Lumlumpit, Iloc				It is believed among the Filipinos to be a good remedy for venomous snake bites.
Lunas, Tag.				
Do	Oleandra neriformis Cav? (Blechnum colubrinum Blanco.)	Filices	Stipe	See Langá.
Lunga, Vis.				See Caguindi.
Lupo, Vis.				See Lanpuyang.
Luya it moros, Vis.				Do.
Luya luya, Vis.				See Banglay.
Do				See Lampupang.
Euyang osiu, Tag.				Do.
Luyangalaba-an, Vis.				See Boá.
Luyos, Pamp.				In decoction are used as febrifuge, tonic emmenagogue, and antihypertic; the sap of the tender stems is also used; the oil in which the bark has been cooked is used as antirheumatic.
Macabuhay, Tag.	Tinospora crispa Miers.	Menispermaceae	Stems	The same uses as the Crispa sp.
Do				See Damong hiyá.
Macahiya, Tag.	Tinospora cordifolia Miers.	do	do	See Huyá huyá.
Do				See Balanti.
Macalísá, Tag.				See Balocas (Ailanthus malabarica DC.).
Do				See Calingad.
Macaliñgag, Tag.				See Bingabing.
Macapara, Vis.				See Camalagui.
Macasampaloc, Tag., Pamp.,				
Vicol.				
Macasili, Vis.				See Aguin.
Madre cacao, Tag.				See Cacaute.
Magatas, Pamp.				See Batobatonis.
Magay-ad, Vis.	(?)		Bark and leaves.	Used for stupefying fish.
Magsaloro, Vis.				See Corazón de angel.
Magtarig, Vis.,				See Camagá taquilis.
Pamp.				
Mahihiiin, Iloc				See Domong hiyá.
Maipaisai, Tag.				See Calomata.
Maiz, common name throughout the Islands.	Zea mays Linn.	Gramineae	Stalk and stigmas.	The decoction of the fresh or dried stalk as well as that of the stigmas is a diuretic much used among the Filipinos.

*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Maiz negro, Ph. Sp. in Visayas.	<i>Zea mays</i> Linn.	Gramineae	Stalk	In decoction it is administered as antidote to the sting of poisonous insects.
Malaapi, Tag.	<i>Premna tomentosa</i> Willd.	Verbenaceae	Leaves	As a diuretic in infusion is a cure for dropsy. See Barubaton.
Malapapulid, Pamp.				See Ayo.
Malabalugbugdaguis, Pamp.				See Aguiu.
Malabanga, Pamp.				See Agohô.
Malabohoc, Vis. Malabohoc, Tag., Vis.	<i>Cassytha filiformis</i> Linn.	Lauraceae	Entire plant	Its decoction is an alternative remedy for certain syphilitic diseases and complaints of the liver.
Malabohoc, Vis.	<i>Ipomoea quamoclit</i> Linn.	Convolvulaceae	Leaves	They are prepared into poultices and employed as a remedy for bleeding hemorrhoids.
Malabulac, Tag.	<i>Bombax malabaricum</i> DC.	Bombacaceae	Roots and gum.	The roots are astringent, restorative, alterative, and aphrodisiac; used as restorative in phthisis; the gum is very astringent.
Malacacao, Tag.				See Cacaocacaoan.
Malacatomon, Tag.	<i>Delima sarmentosa</i> Linn.	Dilleniaceae	Roots and leaves.	In decoction they are an astringent effective against aphtoes; the sap is employed as an efficacious vulnerary.
(?)	<i>Malachra capitata</i> Linn.	Malvaceae	do	Emollient used in decoction for enemas and bathing purposes.
Maladosdós, Vis.	<i>Eranthemum bicolor</i> Schrank.	Acanthaceae	Branches, stems, and leaves.	In decoction they are used to cure aphtoes; also useful for the healing of wounds, ulcers, etc.
Malagoso, Tag.	<i>Mollugo stricta</i> Linn.	Aizoaceae	Leaves and tops.	Eaten raw or cooked; a tonic; cooked with fat or lard and applied externally in those infantile gastric alterations which are followed by tympanites.
Malaisis, Tag.	<i>Malaisia tortuosa</i> Blanco.	Moraceae	Leaves	Administered in decoction to women after childbirth.
Malalason, Samar.				See Cayutana.
Matamata, Zambales.				See Matang olang.
Malapaca, Tag.	<i>Jussiaea suffruticosa</i> Linn.	Onagraceae	Entire plant.	The decoction is administered as diuretic.
Malapacpac, Tag.				See Amulong.
Malaparo, Tag.				See Balao.
Malapalitpit, Pamp.				See Catiquis.
Malasampaga, Pamp.	<i>Wikstroemia viridiflora</i> Meisn.	Thymelaeaceae	Branches and leaves.	The leaves are emetocathartic, and dangerous to administer; the branches are sometimes worn by the natives around the neck to relieve bronchial catarrh.
Malasandia, Vis.	<i>Ipomoea pes-tigridis</i> Linn.	Convolvulaceae	Leaves	Employed in the form of poultices as resolvent of pimples, boils, etc.
Malatalisay, Vis.				See Bancalauag.
Malatinta, Tag.	<i>Phyllanthus reticulatus</i> Muell Arg.	Euphorbiaceae	Bark and leaves.	The bark and the leaves are diuretic and alterative; they are also reported to be blood purifiers.
Malaube, Tag., Vis.				See Aetan.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Malaube, Tag	<i>Aristolochia tagala</i> Cham.	Aristolochiaceae	Root	The same uses as the <i>Indica</i> sp. See <i>Badiara</i> .
Maliana, Tag., Pamp.				See Cuacuacohan.
Malis, Vis	<i>Piper nigrum</i> Linn.	Piperaceae	Fruit	Used as condiment by the Filipinos and also as a stimulant and rubefacient; applied externally. See <i>Ananas</i> .
Malisa, Tag., Vis				See Batobatonis.
Mallisa, so called in Manila.				See Coles maluco.
Malis malis, Pamp.				See Balongay.
Maluco, Tag				Do.
Malungay, Tag				See Amapola.
Malungit, Vis				See Cuacuacohan.
Malva real, Manila.				See Amamale.
Malvas de Castilla.				Do.
Mamale, Vis				See Balung cawayan.
Mamalis, Vis				See Amulong.
Mamalis, Tag				
Mamao, so called in Jolo.				See Bamban.
Mamban, Vis				See Anine.
Mambog, Tag., Vis				See Buyo.
Mamin, Tag., Vicol.				
Mamolís, Tag				See Escobang hebá.
Mamon, Vis				See Buyo.
Mampol, Vis	<i>Hydrangea oblongifolia</i> Blume.	Saxifragaceae	Roots	Pounded and made into poultice for application on swellings of the abdomen. See <i>Dacaput</i> .
Mamugal, Tag., Vis., Vicol, Pamp.				
Maná, so called in Manila, suburbs.	<i>Jatropha multifida</i> Linn.	Euphorbiaceae	Seeds	Anticathartic. Their uses are almost forgotten in native medicine. See <i>Canlará</i> .
Mananaog, Vis				Made into a decoction for use in aphtoes and is also useful in the healing of wounds, ulcers, etc.
Mandalusa, Vis	<i>Eranthemum bicolor</i> Schrank.	Acanthaceae	Roots, stem, and leaves.	The decoction of the root is diuretic; the bark and seeds are astringent; the leaves are prepared like tea, and the resin is a cure for aphtoes. See <i>Agiyangiyang</i> .
Manga	<i>Mangifera indica</i> Linn.	Anacardiaceae	Roots, bark, leaves, seeds, and resins.	Do.
Mangadolong, Vis				The leaves and the bark are used as astringent for the cure of aphtoes and also as a febrifuge; the pericarp is very efficacious in curing chronic intestinal catarrh.
Mañadolong				See Mang-gis.
Mang-gis, Mindanao.	<i>Garcinia mangostana</i> Linn.	Guttiferae	Leaves and pericarp of the fruit.	
Mangis, Mindanao.				
Manguit, Tag	<i>Ehretia buxifolia</i> Roxb.	Borraginaceae	Leaves	Used in infusion like tea. See <i>Bahô bahô</i> .
Manimanian, Tag				See Docot docot.
Manguit, Tag				See Bañgil.
Mantala, Vis				See Campupot.
Manul, Vis				See Macabuhay.
Manungul, Vis. of Iloilo.				
Manzanas, common name almost throughout the islands	<i>Zizyphus jujuba</i> Lam.	Rhamnaceae	Bark and leaves.	Used in decoction as an effective astringent in dysentery, diarrhea, and bowel troubles of all kinds.

*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Manzanilla, so called in Manila	<i>Chrysanthemum indicum</i> Linn.	Compositae	Heads	Used in infusion as carminative.
Manzanitas, Manila.				See Dátiles.
Maragatas, Iloc				See Batobatonis.
Maraicha, Iloc				See Chachachachahan.
Marasbaras, Samar.				See Bañgil.
Maratabaco, Pang				See Ardatag.
Maravilla, so called in Manila.				See Guilalas.
Marayapa, Tag., Pamp.				See Badiara.
Marbar, Vis				See Baga tambál.
Margoso, Vis				See Amargoso.
Mariapa, Tag., Pamp.				See Badiara.
Maria tumbaga, so called in the vicinities of Manila.				See Malatinta.
Maricum, Vis				See Castiocastiogan.
Mariscos, Tag.				See Amor seco.
Maropoto, Vis				See Castiocastiogan.
Marucum, Vis				Do.
Matang bacao, Vis. of Leyte.				See Habas.
Matang olang, Tag.	<i>Salacia prinosides</i> DC. (?)	Hippocrateaceae.	Roots	Used in decoction in cases of dysmenorrhea.
Matang pune, Vis.				See Agiyangyang.
Mawin dato, Vis				See Daraput.
Mawindato, Vis				See Camagsá taquilis.
Mayagos, Vis				See Agoy-oy.
Mayana, Tag., Pamp.				See Badiara.
Mayapis, Tag.	<i>Dipterocarpus turbinatus</i> Gaertn.	Dipterocarpaceae.	Resinous oil	A stimulant of the mucous membrane in general, and of the genito-urinary organ in particular; several resinous oils of this kind have been tried to cure leprosy, but without any positive result; this particular specie is effective in healing wounds.
Miagos, Vis.	<i>Eugenia</i> sp.	Myrtaceae	Branches and leaves.	Brewed into a decoction are employed in children's baths.
	<i>Melia dubia</i> Cav.	Meliaceae	Fruit	Effective antigastralgie and anthelmintic.
	<i>Mesua ferrea</i> Linn.	Guttiferae	Bark and oil of the seeds.	The bark is a mild astringent febrifuge and sudorific; the seeds yield an oil from which an antirheumatic ointment is prepared.
Miagos, Vis.				See Agoy-oy.
Miapi, Tag., Bis.				See Apiapi.
Migui, Pamp				See Calumpang sa lati.
Minuñga, Tag.				See Bilan.
Molawin, Tag.				See Bulaon.
Molopolo, Vis.				See Culatan.
Mopio, Vis.				See Cinco llagas.
Maradong maputi, Tag.				See Balasbás.
Moras, Tag.				See Amoras.
Mosboron, Tag., Vicol, Vis.				See Bacoboc.
Mostaza, so called in almost all the Islands.	<i>Brassica juncea</i> H. f. and T.	Cruciferae	Seeds	When ground are used in poultices as revulsive and internally are taken as a cure for dyspepsia.
Mungo, so called throughout the Islands.				See Balatong.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Mungomungo- han, Tag. Muthá, Tag.	<i>Cyperus rotun- dus</i> Linn.	Cyperaceae	Rhizomae	See Bahô bahô. Considered by the na- tives as a good anti- dysenteric remedy; employed also as diu- retic and lithontriptic; used externally they are good in healing ulcers; they are also sometimes used as a mastic to cure caries of the teeth. See Barobatonos.
Muthang anu- ang, Tag.				See Apalit.
Naga, Tag.				See Agboligan.
Nagboligan, Iloc				See Calut.
Nami, Tag.				See Langa.
Nañga, Tag., Vis.				See Apalit.
Narra, Tag.				See Banilac.
Nato, Vis.				See Lohi.
Ngotugot, Pamp.				See Calumpang sa lati.
Nigui, Tag.				See Anino.
Nino, Tag., Vis.				A lichen which grows on bamboo; it is bitter and is used as an abortive.
Ninoc-noc nicali, Iloc.				See Lobi.
Niog, Tag., Pamp., Vis.				See Camaog.
Niog niog, Tag., Vis.				See Balitadhan.
Niogniogan, Tag.	<i>Mucuna stro- purpurea</i> DC.?	Leguminosae	Roots	Poisonous and, accord- ing to herbalists, if taken, produces fever.
Nipay, Tag., Vis.	<i>Mucuna monosperma</i> DC.?			
Nito, Tag., Vis., Pamp.	<i>Lygodium dichotomum</i> Swartz.	Filices	Stipe	Chewed and applied on bites of venomous animals in order to neutralize the poison.
Nonog, Vis.				See Baliti ( <i>Ficus con- cinna</i> , Miq.).
Oas, Iloc.	<i>Harpullia cupa- nioides</i> Roxb.	Sapindaceae	Bark	Employed to poison fish.
Oay na panglao, Iloc.				See Banay banay.
Odling, Vis.	<i>Cynometra ram- iflora</i> Linn.	Leguminosae	Leaves	Antitherpetic, like those of the Acapulco.
Olaomag, Vis.				See Bangil.
Olasiman, Vis., Tag.	<i>Boerhaavia re- pens</i> Linn.	Nyctaginaceae	Entire plant.	Administered in deco- ction as an effective diuretic.
Olasiman, aso(?) Tag.	<i>Herpestis mon- niera</i> H. B. et K.	Scrophularia- ceae.	do	Used in decoction as diuretic by the na- tives.
	<i>Oldenlandia co- rymbosa</i> Linn.	Rubiaceae	do	Used in decoction as febrifuge and stom- achic.
Omadiung, Pamp.				See Muthá.
Ongon, so called in Zambales.				See Lobi.
Onoran, Pamp.				See Muthá.
Onti, Tag.				See Bolagtob.
	<i>Onychium aura- tum</i> Kaulf.	Orchidaceae	Fronds	The decoction of the fronds is supposed by the natives to be a good antidysenteric.
Oplay, Ibanag.				See Andarayan.
Orayi, Tag., Vis.				See Ayantoto.
Oregano de Es- paña, so called in Manila.	<i>Coleus aroma- ticus</i> Benth.	Labiatae	Leaves	Used in infusion or sirup as aromatic car- minative and admin- istered in cases of dyspepsia.
Oroy, Vis.				See Anan.
Osiu, Tag.				See Bocawe.
Paambalitis, Tag.				See Olasiman.
Pacalcal, Pamp.				See Alim.
Pacapis, Vis.				See Alacasoc.
Pacayumcomcas- tilá, Pamp.				See Acapulco.



## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Pacopol, Tag. Pacpac Langao.	<i>Desmodium trifolium</i> DC.	Leguminosae	Leaves.	See Caguindi. The decoction is administered to children in cases of diarrhea. See Cabcab.
Pacpac lawin, Tag. Do.	<i>Rhaphidophora pertusa</i> Schott.			See Amulong.
Paetan, Vicol., Vis.				See Cacaoencaoan.
Payhod, Vis.				See Adaan.
Palagarium, Vis.				See Daraput.
Palagucon, Vis. Do.				See Agubahan.
Palang, Vis.	<i>Phyllanthus?</i>		Bark.	Employed in stupefying fish.
Palang palangvis. Palay, so called throughout the Islands.	<i>Orizasetiva</i> Linn	Gramineae	Roots, rhizome, stalks, and fruit.	See Habas. The root and rhizomae yield a decoction employed to cure anury; the lye produced by the burned stalk is considered among the Ilocanos as an abortive; the decoction of the fruit is emollient, and so are the seeds when used in poultices.
Palia, Vis.				See Amargoso.
Paliawan, Vis.				See Macabuhay.
Palis, Tag.	<i>Callicarpa blancoi</i> Rolfe.	Verbenaceae	Roots and leaves.	Are smoked like stramonium or thornapple to combat dyspnea and also to stupefy fish.
Paliwan, Samar.				See Macabuhay.
Palma, so called in Manila.				See Abanico.
Palo, Tag.				See Calay calay.
Palo maria, Ph., Sp., Tag., Pamp.				See Bitanhol.
Palo santo, Tag.				See Cumagsá taquilis.
Palsahingín, Tag.				See Alagatlí.
Palunay, Pamp.	<i>Spilanthes acmella</i> Linn.	Compositae	Roots, leaves, and tops.	Brewed as a decoction it is vulnerary. See Escobang haba.
Pamalis, Tag., Vis., Pamp.				See Malisa.
Pamintá, so called throughout the Islands.				
Pamparapit, Tag.	<i>Plumbago rosea</i> Linn.	Plumbaginaceae.	Bark.	Very effective blistering plaster, applied specially in certain fevers; it is also antidyspeptic and ecbotic.
Pamuhát, Vis.				See Adgao.
Pamunuan.	<i>Feronia elephantum</i> Correa.	Rutaceae	Leaves, fruit, and gum.	The leaves are aromatic, astringent and carminative; the fruit is much used in diarrhea and dysentery; the gum is especially used to relieve the tenesmus in intestinal troubles.
Panabulung, Vis.				See Bocaboc.
Panampat, Pamp.				See Bitnong.
Panangong?, Vis.				See Calangcang.
Panaptum, Vis.				See Cinco llagas.
Panas, Tag.				See Balao.
Panawan, Vis.				See Macabuhay.
Pancudo, Tag., Vis.				See Anino.
Pandacaqui, Tag., Pamp.				See Alibutbut.
Pandan, Iloc.				See Banilac.
Pandan, Tag.	<i>Pandanus tectorius</i> Sol. ( <i>Pandanus spiralis</i> Blanco).	Pandanaceae.	Roots.	Yield a decoction used as beverage in cases of blenorhage; this decoction, together with uretral injections of the sap of bananas, is said to be a rapid cure for the above.

*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Pandaya, Vis. ....				See Alibutbut.
Pangagunson, Vis. ....				See Canlará.
Pañgulañgan, Vis. ....				See Bañgil.
Pañgasam, so called in Leyte.				See Banglay.
Pañgantolong, Vis. ....				See Bocaboc.
Pañgi, Vis. ....	<i>Pangium edule</i> Reiw.	Flacourtiaceae	Seeds	Used for stupefying fish.
Pañgiawan, Vis. ....				See Macabuhay.
Pangui, Vis. ....				See Pañgi.
Panhaulñgañtom, Vis. ....				See Bunlao.
Pansipansi, Tag., Vis. ....	<i>Leucas aspera</i> Spreng.	Labiatae	Leaves	Pressed, they are used externally for dermatosis.
Pantog sang usa, Vis. ....				See Bayag cambing.
Panyat, so called in Mindoro.				See Cacaocacaoan.
Paoay, Iloc. ....	<i>Smilax</i> sp.	Liliaceae	Roots and rhizomae.	Taken in the form of decoction as depurative in cases of herpetism, syphilis, etc.
Papaya, so called throughout the Islands.				See Capayas.
Paua, Tag. ....	<i>Panax fruticosum</i> Linn.	Araliaceae	Leaves	The leaves pounded and mixed with salt are vulnerary and considered very efficacious by the natives.
Parag-is, Tag. ....	<i>Paspalum molle</i> Presl.? <i>P. Villosum</i> Blanco.?	Gramineae	Roots and rhizomae.	Used in the form of decoction as an alterative in childbirth.
Paraiso, so called in Manila.	<i>Melia azedarach</i> Linn.	Meliaceae	Outer part of the root, leaves, flowers, and fruit.	The bark is considered vermifuge and useful in leprosy and scrofula; the leaves and flowers are prepared into a poultice to mitigate certain neuralgic affections and also to destroy vermin; also useful in eruptions of the scalp; it is further considered poisonous; used sometimes as anthelmintic.
Parapit, Tag. ....				See Banay banay.
Pari, Vis. ....				See Calaad.
Pari, Iloc. ....				See Amargoso.
Parugtong ahas, Tag. ....				See Bulao-bulao.
Pasao, Vis. ....	<i>Graptophyllum hortense</i> Nees. Var. <i>Foliis ferrugineis immaculatis</i> .	Acanthaceae	Leaves	In topicals they are used for the maintenance of foniculus.
Pasao, na bilóg				See Lamhay.
Pásao na habá, Tag. ....	<i>Corchorus acutangulus</i> Lam.	Italaceae	Seeds	Used in the same manner as Lamhay and for the same affections.
Pasitis, Tag. ....				See Caticot.
Pasotis, Tag. ....				See Alpasotes.
Patat, Tag. ....				See Potat.
Patay odd, Vis. ....				See Calagung-ug.
Patola, Tag. ....	<i>Luffa acutangula</i> Roxb.	Cucurbitaceae	Fruit	Used in decoction and also in powder as an emetic.
Patubo, Tag., Vis. (?)	<i>Pavetta indica</i> Linn.	Rubiaceae	Roots, leaves, and bark.	See Bitogo. The bark in decoction or pulverized is administered especially to children to correct visceral obstructions; the leaves also in decoction are used externally to alleviate the pains caused by hemorrhoids.

*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Payao, Vis				See Apayo.
Payao payao, Vis				See Cosol cosol.
Do				See Gabi gabihan.
Paypay amo,				See Cabcab.
Tag.				
Pepita cabal-				See Canlará.
longa, so called				
in Manila.				
Pepita de San Ig-				Do.
nacio, so called				
in Manila.				
Pepita sa Catba-				Do.
logan, Tag.				
(?)	<i>Pericampylos</i>	<i>Menispermaceae</i>	Entire plant	It has the same uses as
	<i>incanus</i> Miers.			<i>Chanchanchan-</i>
				<i>chauan</i> .
(?)	<i>Phyllanthus uri-</i>	<i>Euphorbiaceae</i>	do	The same uses as Yerba
	<i>naria</i> Linn.			de San Pablo,
(?)	<i>Physalis mini-</i>	<i>Solanaceae</i>	Leaves and tops	Taken internally in
	<i>ma</i> Linn.			decoction as tonic and
				diuretic.
Piapi, Vis				See Apiapi.
Pias, Iloc				See Calamias.
Pilani, Tag	<i>Canarium com-</i>	<i>Burseraceae</i>	Oleo resin and	The oleo resin is mixed
	<i>mune</i> Linn.		oil of the	with an ointment of
			seeds.	varied composition as
				stimulant; the oil of
				the seed is a mild pur-
				gative, not much
				used.
Pili, Vis				See Pilani.
Pilis, Vis				See Cuacuacohan.
Pincapinca, Tag				See Abang-abang.
Pincapinca han,				Do.
Tag.				
Pingot bató, Tag				See Liñgat.
Piña, so called in				See Ananas.
all the native				
dialects.				
Piñones, so called				See Balitadhan.
in the vicinity				
of Manila.				
Pipisic, Tag				See Apiapi.
Pisa, Tag				See Pilani.
Pita, Vicol				See Ananas.
Pitoco, Tag., Vis				See Bitogo.
	<i>Planchonia va-</i>	<i>Lecythidaceae</i>	Fruit	Toxic; used in fishing.
	<i>lida</i> Blume.			
Poas, Tag				See Oas.
Pol-o sang liso-				See Butuhan.
han, Vis.				
(?)	<i>Polycarpon co-</i>	<i>Caryophylla-</i>	Entire plant	Administered in decoction
	<i>rymbosa</i> Lam.	<i>ceae</i> .		internally and
				externally as antidote
				to snake venom.
(?)	<i>Polygala chine-</i>	<i>Polygalaceae</i>	do	Used as is the species
	<i>sis</i> Linn.			<i>Telephoides</i> .
(?)	<i>Polygala tele-</i>	do	do	Used as expectorant,
	<i>phoides</i>			especially in bronchial
	Willd.			catarrh.
Pomoncan, Vis				See Pamunuan.
Poncan, Vis				See Daraput.
Poras, Vis				See Banquiling.
Potat, Vis	<i>Barringtonia</i>	<i>Lecythidaceae</i>	Bark	In decoction it is used
	<i>racemosa</i> Bl.			externally as anti-
				rheumatic.
(?)	<i>Pouzolzia</i> sp.	<i>Urticaceae</i>	Leaves	Used as vulnerary.
(?)	<i>Pouzolzia vimi-</i>	do	do	Used as vulnerary but
	<i>nea</i> Wedd.			especially as cicatri-
				sant of gangrenous
				ulcers.
Pugahan, Tag				See Anibung.
Pugbuhay para-				See Agiyangiyang.
tos, Pang.				
Pulpulto, Iloc				See Chachachachahan.
Pungapung,				See Anan.
Tag., Vis., Iloc,				
Pang.				
Pupol señora, Tag				See Guilalas.
Puquingan, Tag				See Colocanting.
Puqing bahay,				See Guiti sang hari.
Tag.				
Puqui nang hari				Do.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Pusô pusô, Tag				See Lauat.
Putat				See Potat.
Quélua, Tag				See Mostaza.
Quilitis, Tag				See Ayantoto.
Quinapistula, Tag	<i>Cassia javanica</i> Linn.	Leguminosae	Fruit and leaves	The leaves are mildly purgative.
Quinchay, Tag	<i>Apium graveolens</i> Linn.	Umbelliferae	Entire plant	The decoction brewed from the entire plant is said to be diuretic and an emmenagogue. See Cadayohan.
Quindayohan, Tag.				See Caticot.
Quiticot, Vis.				When roasted they are used as emollient.
Rabo de león, so called in Manila.	<i>Sansevieria zeylanica</i> Willd.	Liliaceae	Leaves	See Rabo de león.
Rabo de tigre, so called in Manila.				Do.
Rabo de vaca, so called in Manila.				See Amoras.
Raiz de moras, so called in many parts of the Islands.				See Dátiles.
Rátiles, so called in some towns.				See Anibug.
Ratipan, Iloc.				See Bañgil.
Boenohan, Vis.				See Dumero.
Romero				Like all of its species, it is used as depurative of the blood; it is anti-syphilitic, antirheumatic, and is usually effective in all cutaneous affections.
Ronas, Vis.	<i>Smilax macrophylla</i> Roxb.	Liliaceae	Roots and rhizome.	See Ahito.
Rosas de Ejipto, Vis.				See Manzanilla.
Rosas de Japón.				See Chichirica.
Rosas de Bay bay, Vis.				
(?)	<i>Rourea multiflora</i> Planch.	Connaraceae	Roots	Like sarsaparilla in decoction, considered depurative and an emmenagogue.
(?)	<i>Rubia cordifolia</i> Linn.	Rubiaceae	do	Used in decoction to combat certain disorders of the urinary system. See Dura.
Ruda, so called in Manila.				See Baguilumbang and Lumbang, Tag
Rumibang, Vis				See Buyo buyo.
Sabia, Tag				See Dilang buaya.
Sábila, Tag				See Alicabañon.
Sabilao, Vis				See Alibun.
Sabusub, Iloc.				See Agyiangyang.
Sagá, Tag				Do.
Sagamamin, Tag				Do.
Sagá sagá, Tag				Used as stimulant and carminative.
Sagá sagá, Tag. of Norzagaray.	<i>Alpinia</i> sp.	Zingiberaceae	Rhizome and fruit.	See Bulaon.
Sagat, Iloc				See Bulao bulao.
Sag-id, Vis				See Cabiteabag.
Sagmit, Tag				See Amuyong.
Saguiat, Iloc				See Cacuentasan.
Saguing saguing, Vis.				
Saguinsin, Vis				See Candon.
Sala, Tag., Vis				See Banato.
Saladay, Vis				See Cayutana.
Salagó, Tag				See Malasampaga.
Do	<i>Phaleria perrottiana</i> Benth. et Hook. f.	Thymelaceae	Leaves and bark.	The leaves are used as emetic and the bark as mild revulsive in cases of bronchial irritation.
Salapao, Tag	<i>Ventilago madraspatana</i> Gaertn.	Rhamnaceae	Bark	Pulverized and mixed with oil it is useful in certain cutaneous diseases.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Salapay, Iloc	Connarus fer-rugineus Jack.	Connaraceae	Roots	Medicinal uses unknown; possibly it has the same application as the <i>Rourea heterophylla</i> and the <i>R. Rugosa</i> Planch. See Agac-ac.
Salaguing pula, Tag.				
Salay, Vis., Pamp.				See Baga tambal.
Salay, Vis.				See Cayutana.
Salay, Tag.				See Baliyoco.
Salbang, Pamp.				See Canrab.
Saleng, Iloc	Pinus insularis Endl.	Pinaceae	Bark	Yields an astringent decoction. See Agubahan.
Salibangbang, Vis.				
Salincappa, Vis.				See Bulaon.
Salingboboc, Vis.				See Balay namoc.
Saling ouac, Vis.				See Agbeligan.
Saling ouac nga maitum, Vis.				See Bagauac namorado.
Salipao, Tag.				See Salapao.
Sal-lacapo, Iloc				See Calagung-ug.
Salomague, Iloc				See Camalagui.
Salong, Vis.				See Alagatlil.
Salsalida, Tag. of Manila.				See Malagoso.
Saltique, Tag.				See Cacaocacaoan.
Saluncad, Zambaleño.				See Dail.
Samac, Iloc				See Bilan.
Samaritana, Vis.				See Angélico.
Samat, Pamp.				See Buyo.
Sambag, Vis.				See Camalagui.
Sambilao, Vis.				See Guiti sang hari.
Sambong, Tag., so called almost throughout the Islands.				See Alibum.
Sambong gala, Tag.				See Talatabaco.
Sambong gala, Tag.	Pterocaulon cylindrostachyum Clarke.	Compositae	Leaves and tops	Used in decoction for stimulant baths.
Sampaca, Tag., so called throughout the Islands.				See Champaca.
Sampaga, Tag.				
Sampagang parang, Tag.				See Campupot.
Sampalagui, Vis.				See Malasampaga.
Sampaloc, Tag., Pamp., Vicol., Vis.			Bark, leaves, and fruit.	See Camalagui. Do.
Sampaloc	Sampalucan			See Yerba de San Pablo.
Sampapare, Vis.				See Calaad.
Sampay, Tag.	Cuscuta reflexa Roxb.	Convolvulaceae	Entire plant	Depurative used in many cases with the same effect as sarsaparilla; also used in baths to cure certain forms of dermatosis.
Sandalitan, Vis.				See Bangil.
Sandicquit, Tag.				See Bambang.
Sanque(?), Vis.				See Apalit.
Sansaul, Tag. of Bataan.				See Catiquis.
Sansaosaosaon, Tag.				See Calaad.
Santan, Tag.	Ixora coccinea Linn.	Rubiaceae	Roots and flowers.	The roots in decoction are antidiysenteric and febrifuge; the flowers, either in decoction, macerated in water or alcohol, are considered as astringent against hemophthisis and dysentery.
Santiago, Vis.				See Aroma.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Santol, so called throughout the Islands.	Sandoricum indicum Cav.	Meliaceae -----	Leaves -----	Fresh and applied to the skin they are sudorific; in decoction they are used in baths in cases of fever.
Sapang, Tag., Vis.	Caesalpinia sap-pan Linn.	Leguminosae----	Bark, wood, and seeds.	In decoction it is used as hemostatic and astringent antidiarrhetic; the seeds roasted are known to cure rash. (Erythema caloris?)
Sapinit, Vis	-----	-----	-----	See Castioeastogan.
Do.	-----	-----	-----	See Dagamit.
Sapnit, Tag., Pamp.	-----	-----	-----	See Cabit cabag.
Sapin sapin, Tag.	Blechum brownii Juss.	Acanthaceae ----	Entire plant----	In the form of decoction it is antibleorrhagic.
Sarapa, Iloc. of Abra.	-----	-----	-----	See Palis (Callicarpa).
Sarasa, Tag. of Manila.	-----	-----	-----	See Pasao, Vis.
Saromo, Vis	-----	-----	-----	See Angud.
Saruncar, Iloc	-----	-----	-----	See Dail.
Sasa, Iloc	-----	-----	-----	See Chachachachahan.
Sawa sawa, Vis	Flacourtia ramontchi L'Herit.	Flacourtiaceae --	Bark, leaves, and fruit.	The fruit is edible and is similar to that of the Bintahoi; the bark in decoction is astringent.
Sayua, Vis	-----	-----	-----	See Patola.
Sayican, Tag	Schleichera trijuga Willd.	Sapindaceae ----	Bark and oil of the seeds.	See Batobatonis.
-----	-----	-----	-----	The bark is astringent and is used pulverized and mixed with oil to cure irritation in certain cutaneous eruptions; the oil of the seeds is a valued hair stimulant.
Siac, Vis	-----	-----	-----	See Alipata.
(?)	Siegesbeckia orientalis Linn.	Compositae-----	Leaves -----	Alterative in decoction and vulnerary when applied in form of lotion.
Siempre vivo, Sp. Fil.	-----	-----	-----	See Angelico.
Siete cabrillas, so called in Manila.	-----	-----	-----	See Bulac castila.
Sibog, Tag	Acacia concinna DC.	Leguminosae----	Fruit -----	Used in decoction as a fluidificant in fevers.
Sibuyas, a corruption of the Spanish word cebollas generalized in all the Archipelago.	-----	-----	-----	See Lasuna.
(?)	Sida cordifolia Linn.	Malvaceae -----	Leaves -----	Emollient in decoction, having diuretic properties.
(?)	Sida humilis Willd.	-----do-----	Entire plant----	Used in decoction as a specific for gonorrhea.
Sigang dagat, Tag.	-----	-----	-----	See Ardatag.
Do	-----	-----	-----	See Dilang usá.
Sit, Vis	-----	-----	-----	See Cabit cabag.
Sila sila, Tag	-----	-----	-----	See Hingasin.
Sile, Tag., Vis	-----	-----	-----	See Caticot.
Silhigon, Vis	-----	-----	-----	See Escobang habá.
Siling bundoc, Tag.	-----	-----	-----	See Caticot.
Siling labuyo, Tag.	-----	-----	-----	Do.
Sililihan, Tag	Eranthemum bicolor Schrank.	Acanthaceae ----	Roots, stems, and leaves.	Used in the form of decoction as remedy for apthoes, and in healing wounds, ulcers, etc.
Simac, Pamp	-----	-----	-----	See Ardatag.
Sincamas, Tag., Iloc.	-----	-----	-----	See Hincamas.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Siniguelas, Tag., corruption of ciruelas.	<i>Spondias purpurea</i> Linn.	Anacardiaceae	Bark	The decoction is an efficacious antidiysenteric and is also used in cases of infantile tympanites.
Sipit olang, Tag.				See Camagsa.
Siruelas, Tag.				See Siniguelas.
Sisichan, Pamp.				See Batobatonis.
Sobsob, Iloc.				See Alibum.
Sodosodo, Vis.				See Bait.
Solasi, Tag.				See Albahaca de limón.
Solaso lasihan, Tag.				See Pansi pansí.
Solonga, Vis.				See Camantigui.
Sonting, Tag., Vis.				See Acapulco.
Soob cabayo, Tag.				See Bangbansit.
Sorog sorog, Vis.				See Bait.
Sorosoro, Pamp., Tag., Vis.				See Bait.
(?)	<i>Spermacoe hispida</i> Linn.	Rubiaceae	Leaves and tops	Brewed into a decoction they are used as an astringent in hemorrhoids.
(?)	<i>Stephania bernandifolia</i> Wall.	Menispermaceae	Entire plant	Has properties similar to Chanchuchanchauan.
Sucao, Iloc.				See Bacnó.
Suelda consuel-da.				See Catuit.
Suganda, Tag.				See Orégano de España.
Sugpon-sugpok, Vis.	<i>Vitis quadrangularis</i> Wall.	Vitaceae	Stems	The sap is applied in the form of drops in cases of otorrhea and epistaxis; it is also an alterative in irregularities of menstruation.
Suhá, Tag.				See Lucban.
Sumá, Pamp., Vis.				See Abuta.
Sumalagui, Vis.				See Calamagui.
Sumin, Vicol.				See Banhag.
Sungit olang, Vis.				See Malatinta.
Sungot olang.	<i>Breynia rhamnoides</i> Muell. Arg.	Euphorbiaceae	Bark	Astringent used to prevent hemorrhage.
Suraña, Vis.				See Camantigui.
Sursur, Pamp.				See Muthá.
Susocoyoli, Tag.				See Ayo.
Tabaco, so called throughout the Archipelago.	<i>Nicotiana tabacum</i> Linn.	Solanaceae	Leaves	Used fresh as sedative and maturative in poultices; the decoction of dried leaves is used for enemas in expelling certain worms.
Tabatabacohan, Tag.				See Ardatag.
Tabigui, Tag., Vis.				See Calumpang sa lati.
Tabion, Tag. of Angat.	<i>Pimelocodendron amboinicum</i> Hassk.?	Euphorbiaceae	Leaves	Pounded or squeezed they are used to poison fish.
Tabobongyan, Vis.				See Bastón de San José.
Tabòg, Tag.	<i>Aegle glutinosa</i> Merrill.	Rutaceae	Outer part of the root, leaves, fruit, and gum.	The same uses as the Pamunuan.
Tabòng, Tag.	<i>Solanum melongena</i> Linn.	Solanaceae	Leaves	Used in the form of poultice or pomade to assuage hemorrhoids.
Tabòng, Vis.				See Bilan.
Tabtabocol tinu-ang, Iloc.				See Olasiman.
Tabtabocol, Iloc.	<i>Coldenia procumbens</i> Linn.	Borraginaceae	Leaves	Applied in poultices to mature abscesses; the dried leaves pulverized provoke sneezing.
Tabùg, Vis.				See Cuacuacohan.
Tabulali, Vis.				See Balbalosa.
Do	<i>Solanum indicum</i> Linn.	Solanaceae	Roots	In the form of decoction it is taken internally to cure asthma, and as a general stimulant.
Taburuñgian, Vis.				See Barbás vaquero.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Tacay tacay, Vis.				See Cosol cosol.
Tachibong, Vis.				See Catchibong.
Tacolin, Vis.				See Amulong.
Tacpó, Tag.	Psychotria tacpó Rolfe.	Rubiaceae	Roots	Yields an antidysenteric decoction.
Tacpus, Tag., Vis.				See Animo.
Tae-tac, Vis.				See Cantutay.
Tacurangán, Tag., Vis., Pamp.				See Antolangan.
Tagabang				See Lamhay.
Tagalhi, Tag.				See Ajos ajos ñga maputi.
Tagabili, Vis.	Conyza viscidula Wall.	Compositae	Leaves	The leaves pounded are applied for stomachic pains.
Tagactagac, Tag.	Rhinacanthus communis Nees.	Acanthaceae?	Roots and leaves	The sap of the root and leaves, or their decoction, is thought efficient in certain obstinate forms of dermatosis.
Tagbac, Tag., Pamp., Vis.				See Bagombong.
Tagbac, Tag.				See Balubalu in Pamp.
Tagbaetabac, Tag.				See Bambán.
Taghilao, Tag.				See Abagabang.
Taglinao, Tag.				See Malabulag.
Tagnaangtagna, Vis.				See Macabuhay.
Tagpó, Vis.				See Tacpó.
Tagugtagug, Vis.				See Bulao bulao.
Taguilma, Vis.				See Calangcang.
Taguima, Vis.				Do.
Tagulaoy, Vis.				See Bulao bulao.
Tagulinaw, Tag.				See Libun.
Tagum, Vis.	Indigofera trifoliata Linn.	Leguminosae	Seeds	Used mixed with other mucilaginous substances as an emollient and tonic.
Do.	Indigofera tinctoria Linn.	do	Coloring matter	Dissolved in water it is employed as a remedy for amygdalitis.
Tagumbao, Iloc.				See Casla.
Tagustagús, Vicol.				See Bocaboc.
Taiñgan dagá, Tag.				See Ayo.
Taiwanac, Tag.				See Butong (Bambusa blancoi, Sten.).
Talá, Tag., Vis.	Limnophylla Roxb.	Scrophulariaceae	Leaves	Aromatic and stimulant.
Talactac, Iloc.				See Dawag.
Talafud, Ibanag.				See Ajos.
Talamponay, Tag.				See Catchibong.
Talamponay na itim, Tag.	Datura fasthosa Linn.	Solanaceae	Roots, leaves, flowers, and seeds.	Poisonous; used in medicine for the same purposes as D. stramonium and D. alba; the leaves and flowers when smoked are used for dyspnoea in bronchitis.
Talancao, Iloc.				See Bangbang.
Talangtalang, Tag., Vis.				See Anis cahoy.
Talatabaco, Vis.	Sphaeranthus indicus Linn.	Compositae	Leaves and tops.	Brewed into a decoction they are taken as a stomachic tonic and also as antibilenorragic.
Talatalá, Pamp., Vis.				See Talá.
Talatalarawan, Tag.				See Aetan.
Talbacbabae, Tag.				See Banglay.
Talictang, Tag.				See Aguiú.
Taliantar, Pamp.				See Anino.
Taliñgharap, Tag.				See Albahaca, Vis.
Talisay, Tag., Vis.				See Banilac.
Taloto, Tag.				See Basain.
Talutu, Vis.				See Malabulac.



*Medicinal plants of the Philippine Islands—Continued.*

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Tamawian, Tag.				See Bitanhol.
Tambál, Tag.				See Abud.
Tambalaguisay, Vis.				See Bañgil.
Tambalisa, Tag.				Do.
Do.	<i>Cassia sophera</i> Linn.	Leguminosae	Seeds	Febrifuge.
Tamó, Tag.				See Lampuyang.
Tamohilang, Tag.				Do.
Tampal boá, Tag.				See Calaboa.
Tamping, banal, Tag.				See Amulong.
Tan-ag, Tag.				See Bitnong.
Tanag, Vis.				Do.
Tañgal, Tag.	<i>Rhizophora conjugata</i> Linn.	Rhizophoraceae	Bark	Yields an astringent and coloring matter.
Tañgan tañgan, Tag., Iloc.				See Liñgasina.
Tañgan tañgan, Morado.	<i>Ricinus communis</i> Linn. (forma sub-purpurascens Muell).	Euphorbiaceae	Leaves	The leaves cooked with milk are employed in poultices for certain kinds of ulcers.
Tañgisan baya-wac, Tag.	<i>Ficus radicans</i> Lam?	Moraceae	Latex	It is resolvent and considered effective in uniting fractures of the bones.
Tañgitan, Vis.				See Cayaoyao.
Tanglad, Tag., Vis.				See Biliyoco.
Tanglay, malo-to, Pamp.				See Adgao.
Tangpupo, Vis.				See Antan.
Tañgulón, Vis.				See Balitadhan.
Taoín taoín, Iloc.				See Malaubi.
Tamohilang, Tag.				See Lampuyang.
Tannual, Vis.				See Abud.
Tapiasín, Tag.				See Tabtabocol.
Tapit, Viscol.				See Alim.
Tapolangá, Tag., Vis., Pamp.				See Antolangan.
Taponaya, Vis.				See Badiara.
Tapul, Vis.				See Maiz negro.
Tapuranga, Vis.				See Cacuéntasan.
Taquim baka-baca, Iloc.				See Escobang habá.
Taquip asín, Tag.				See Alim.
Taquip, cohól, Tag.	<i>Hydrocotyle asiatica</i> Linn.	Umbelliferae	Leaves	The sap is a curative for wounds of the sclerotic; the decoction is considered diuretic and useful in gonorrhea.
Tatátará, Iloc.				See Talá.
Tarambulo, Tag.				See Balbalosa.
Taramhampan, Tag.				See Tala.
Taratacopes, Vis.				See Cuachnacohan.
Tarocanga, Tag., Vis., Pamp.				See Antolangan.
Tawa tawa, Iloc.				See Caslá.
Tawa tawa, Vis.				See Batobatonis.
Tawatawansina, Iloc.				See Liñgasina.
(?)	<i>Teramnus labialis</i> Spreng.	Leguminosae	Leaves	Known as antirheumatic and good for paralysis; used by the Filipinos.
(?)	<i>Ternstroemia toquian</i> F. Villar.	Theaceae	Bark	Used as poison in fishing; this bark should be tried in therapeutics.
Tibatid, Pamp.				See Cabcab.
Tibalib, Vis., Tag.	<i>Rhaphidophora pertusa</i> Schott.			See Amulong.
Tibiayon, Vis.				See Condol.
Tibic, Tag.				See Aimit.
Ticamás, Vis.				See Hincamás.
Ticas ticas, Tag.				See Cacuéntasan.
Do.				See Adlay.
Ticla, Tag.				See Calayate.
Tigao, Vis.				See Palis.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Tigbe tigbe, Vis.				See Cacuentasan.
Tigbi, Tag.				See Adlay.
Tigre, so called in Manila.				See Abanico.
Tihol tihol, Vis.				See Cincollagas.
Timbañgan, Tag.				See Aetan.
Do.				See Malaube.
Timbang timbañgan, Tag.				Do.
Timbang timbañgan.				See Aetan.
Tinã tinaan, Tag.				See Malatinta.
Tingatiña, Tag.				See Balay lamoc.
Tingloy, Tag.				See Doloariw.
Tinsim, Tag, Iloc.	Rottboellia muricata Retz.	Gramineae	Pitch	Yields a diuretic decoction.
Tinta tinta, Iloc.				See Higuic manoc.
Tintatintahanan, Tag.				See Malatinta.
Tipolo, Tag., Pamp., Vis.				See Antipolo.
Tiquis tiquis, Tag.				See Cacuentasan.
Do.				
Titio, Vis.				See Catiquis.
Tiwit tiwit, Vis.				See Doloariw.
Toar, Vis.				See Cabcab.
Toblé, Vis.				See Alibutbut.
Toctoc caló, Tag.	Milletia splendens W. et A.	Leguminosae	Bark	Used in fishing, to poison the water.
	Cerbera odollam Gaertn.	Apocynaceae	Seeds	Toxic; employed in fishing in small rivers.
(?)	Todalia aculeata Pers.	Rutaceae	Roots, bark, and leaves.	The root administered in the form of decoction is antidiarrhetic and dynamogenons during convalescence from fevers; the bark is used in infusion as a stomachic bitter tonic and febrifuge; the leaves chewed fresh are useful in stomach disorders.
Tombong aso, Tag., Vis.				See Anino.
Tofogog, Vis.				See Tañgal.
Toptop, Cag., Mis.				See Canlará.
Toquian, Tag.	Ternstroemia toquian Villar.	Theaceae	Bark	Used especially in fish poisoning.
	Torenia asiatica Linn.	Sorophulariaceae.	Entire plant	Used in decoction as an antigonorrhetic diuretic.
Tres puntas, Ph. Sp., Manila				See Alim.
(?)	Tribulus cistoides Linn.	Zygophyllaceae	Entire plant	Used in decoction as diuretic in gonorrhea and dropsy.
(?)	Trichodesma indicum Br.	Borraginaceae	Flowers	Administered in infusion as sudorific and pectoral.
	Trichosanthes palmata Roxb.	Cucurbitaceae	Roots and fruit	Considered poisonous, but sometimes used in certain cattle diseases.
Trompalipante, so called in Manila.				See Cabracabrá.
Tubá, Tag.				See Caslá.
Tubá, Tag., Pamp., Vis.				See Abuta.
Tubá sa buquid, Vis.				See Balanti.
Tubang dalág, Tag.				See Palis.
Tubá tubá, Tag.				See Caslá.
Tublé, Tag.				See Toble.
Tucod banua, Pamp.				See Anan.
Tucod Lañgit, Tag., Vis., Iloc., Pang.				Do.
Tuó, Tag.	Dolichandrone spathacea K. Sch.	Bighoniaceae	Seeds	Administered in powder generally for some nervous complaint.

## Medicinal plants of the Philippine Islands—Continued.

Vulgar name.	Scientific name.	Family.	Part used.	Medicinal uses.
Tugabang, Vis.				See Cabit cabag.
Tuglima, Vis.				See Calangcang.
Tuguis, Tag., Pamp.				See Balu balu in Pamp.
Tumbong aso, Tag.				See Banglay.
Tumoong asong hapay, Tag.				See Halon.
Tunkin, so called in many parts of the Islands.				See Antidoto.
	<i>Tylophora per- rotetiana</i> Decne.	Asclepiadaceae.	Leaves.	The leaves are used as a vulnerary with won- derful effect.
Uac, Vis.				See Arayan.
Uac, Vis.	<i>Calamus</i> (?)		The rhizome.	Yield an antigestralgic decoction.
Uantic, Vis.				See Cabaleta.
Ubeube, Tag., Vis.				See Actan.
Ugabang, Vis.				See Cabit cabag.
Ungali na pula, Vis., Pamp.				See Camagsá taquilis.
Upo, Tag.	<i>Lagenaria vul- garis</i> Seringe.	Cucurbitaceae	Green fruit.	Prepared into sirup like the pulp it is consid- ered as pectoral.
(?)	<i>Uraria lagopoi- des</i> DC.	Leguminosae	Entire plant.	In form of decoction it is said to be an alter- ative and tonic.
(?)	<i>Uraria picta</i> Desv.	do	Leaves.	Emollient in form of decoction.
(?)	<i>Vandellia soria- na</i> Blanco.	Scrophula- riaceae.	Entire plant.	Its decoction is purga- tive and is used in the treatment of dropsy.
Verdolagas, Ma- nila.				See Ausiman.
(?)	<i>Vernonia cinera</i> Less.	Compositae	Leaves.	Used in decoction against humid herpes, eczema, etc.
(?)	<i>Viscum orien- tale</i> Willd.	Loranthaceae	Entire plant.	Used as tonic in bathing after childbirth.
(?)	<i>Vitis indica</i> Linn.	Vitaceae	Roots.	Used in decoction as a depurative of the blood, in the same way as sarsaparilla.
Waliaswalisan, Tag.				See Escobang haba.
Wawalisin, Tag., Vis., Pamp.				Do.
(?)	<i>Wrightia tincto- ria</i> R. Br.	Apocynaceae	Bark and seeds.	The bark taken in form of decoction is tonic, and the seeds are con- sidered aphrodisiac.
Yabag, Vis.				See Bañgil.
Yahon yahon, Vis.				See Taquípalcohol.
Yampong, Vis.				See Cuacuacohan.
Yayo, Pamp.				See Ayo.
Yerba buena, so called through- out the Islands.	<i>Mentha arvensis</i> Linn.	Labiatae	Tops and leaves.	Carminative and astring- ent; when moistened they are used as a cure for the stings of poisonous insects.
Yerbaca, Iloc.				See Ca maria.
Yerba de San Pa- blo, Vis.	<i>Phyllanthus ni- ruri</i> Muell. Arg.	Euphorbiaceae	Entire plant.	Used in decoction as a tonic for the stomach; it is also emmena- gogue and febrifuge of positive results in agues.
Yerba de San Pe- dro, Vis.				See Yerba de San Pablo.
Yerba maria, Iloc.				See Ca maria.
Yerba mora, Ma- nila and vicini- ty.				See Amoras.
Zapote negro, so called in many parts of the Islands.	<i>Diospyros ebe- num</i> Koen.	Ebenaceae	Bark and leaves.	Employed pounded as a blistering plaster.
Zarzaparrilla, Sp. Fil.				See Camagsá.

## APPENDIX G.

### ACTS OF CONGRESS RELATING TO THE PHILIPPINES.

[PUBLIC—No. 28.]

An Act temporarily to provide revenue for the Philippine Islands, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the provisions of an Act entitled "An Act to revise and amend the tariff laws of the Philippine Archipelago," enacted by the United States Philippine Commission on the seventeenth day of September, nineteen hundred and one, shall be and remain in full force and effect, and there shall be levied, collected, and paid upon all articles coming into the Philippine Archipelago from the United States the rates of duty which are required by the said Act to be levied, collected, and paid upon like articles imported from foreign countries into said Archipelago.

SEC. 2. That on and after the passage of this Act there shall be levied, collected, and paid upon all articles coming into the United States from the Philippine Archipelago the rates of duty which are required to be levied, collected, and paid upon like articles imported from foreign countries: *Provided*, That upon all articles the growth and product of the Philippine Archipelago coming into the United States from the Philippine Archipelago there shall be levied, collected, and paid only seventy-five per centum of the rates of duty aforesaid: *And provided further*, That the rates of duty which are required hereby to be levied, collected, and paid upon products of the Philippine Archipelago coming into the United States shall be less any duty or taxes levied, collected, and paid thereon upon the shipment thereof from the Philippine Archipelago, as provided by the Act of the United States Philippine Commission referred to in section one of this Act, under such rules and regulations as the Secretary of the Treasury may prescribe, but all articles, the growth and product of the Philippine Islands, admitted into the ports of the United States free of duty under the provisions of this Act and coming directly from said Islands to the United States for use and consumption therein, shall be hereafter exempt from any export duties imposed in the Philippine Islands.

SEC. 3. That on and after the passage of this Act the same tonnage taxes shall be levied, collected, and paid upon all foreign vessels coming into the United States from the Philippine Archipelago which are required by law to be levied, collected, and paid upon vessels coming into the United States from foreign countries: *Provided, however*, That until July first, nineteen hundred and four, the provisions of law restricting to vessels of the United States the transportation of passengers and merchandise directly or indirectly from one port of the United States to another port of the United States shall not be applicable to foreign vessels engaging in trade between the Philippine Archipelago and the United States, or between ports in the Philippine Archipelago: *And provided further*, That the Philippine Commission shall be authorized and empowered to issue licenses to engage in lighterage or other exclusively harbor business to vessels

or other craft actually engaged in such business at the date of the passage of this Act, and to vessels or other craft built in the Philippine Islands or in the United States and owned by citizens of the United States or by inhabitants of the Philippine Islands.

SEC. 4. That the duties and taxes collected in the Philippine Archipelago in pursuance of this Act, and all duties and taxes collected in the United States upon articles coming from the Philippine Archipelago and upon foreign vessels coming therefrom, shall not be covered into the general fund of the Treasury of the United States, but shall be held as a separate fund and paid into the Treasury of the Philippine Islands, to be used and expended for the government and benefit of said Islands.

SEC. 5. That when duties prescribed by this Act are based upon the weight of merchandise deposited in any public or private bonded warehouse, said duties shall be levied and collected upon the weight of such merchandise at the time of its entry.

SEC. 6. That all articles manufactured in bonded manufacturing warehouses in whole or in part of imported materials, or of materials subject to internal-revenue tax and intended for shipment from the United States to the Philippine Islands, shall, when so shipped, under such regulations as the Secretary of the Treasury may prescribe, be exempt from internal-revenue tax, and shall not be charged with duty except the duty levied under this Act upon imports into the Philippine Islands.

That all articles subject under the laws of the United States to internal-revenue tax, or on which the internal-revenue tax has been paid, and which may under existing laws and regulations be exported to a foreign country without the payment of such tax, or with benefit of drawback, as the case may be, may also be shipped to the Philippine Islands with like privilege, under such regulations and the filing of such bonds, bills of lading, and other security as the Commissioner of Internal Revenue may, with the approval of the Secretary of the Treasury, prescribe. And all taxes paid upon such articles shipped to the Philippine Islands since November fifteenth, nineteen hundred and one, under the decision of the Secretary of the Treasury of that date, shall be refunded to the parties who have paid the same, under such rules and regulations as the Secretary of the Treasury may prescribe, and a sum sufficient to make such payment is hereby appropriated, out of any money in the Treasury not otherwise appropriated.

That where materials on which duties have been paid are used in the manufacture of articles manufactured or produced in the United States, there shall be allowed on the shipment of said articles to the Philippine Archipelago a drawback equal in amount to the duties paid on the materials used, less one per centum of such duties, under such rules and regulations as the Secretary of the Treasury may prescribe.

SEC. 7. That merchandise in bonded warehouse or otherwise in the custody and control of the officers of the customs, upon which duties have been paid, shall be entitled, on shipment to the Philippine Islands within three years from the date of the original arrival, to a return of the duties paid less one per centum, and merchandise upon which duties have not been paid may be shipped without the payment of duties to the Philippine Islands within said period, under such rules and regulations as may be prescribed by the Secretary of the Treasury.

SEC. 8. That the provisions of the Act entitled "An Act to simplify the laws in relation to the collection of revenues," approved June tenth, eighteen hundred and ninety, as amended by an Act entitled "An Act to provide for the government and to encourage the industries of the United States," approved July twenty-fourth, eighteen hundred and ninety-seven, shall apply to all articles coming into the United States from the Philippine Archipelago.

SEC. 9. That no person in the Philippine Islands shall, under the authority of the United States, be convicted of treason by any tribunal, civil or military, unless on the testimony of two witnesses to the same overt act, or on confession in open court.

Approved, March 8, 1902.

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[PUBLIC—No. 235.]

An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the action of the President of the United States in creating the Philippine Commission and authorizing said Commission to exercise the powers of government to the extent and in the manner and form and subject to the regulation and control set forth in the instructions of the President to the Philippine Commission, dated April seventh, nineteen hundred, and in creating the offices of Civil Governor and Vice-Governor of the Philippine Islands, and authorizing said Civil Governor and Vice-Governor to exercise the powers of government to the extent and in the manner and form set forth in the executive order dated June twenty-first, nineteen hundred and one, and in establishing four Executive Departments of government in said Islands as set forth in the Act of the Philippine Commission, entitled "An Act providing an organization for the Departments of the Interior, of Commerce and Police, of Finance and Justice, and of Public Instruction," enacted September sixth, nineteen hundred and one, is hereby approved, ratified, and confirmed, and until otherwise provided by law the said Islands shall continue to be governed as thereby and herein provided, and all laws passed hereafter by the Philippine Commission shall have an enacting clause as follows: "By authority of the United States be it enacted by the Philippine Commission." The provisions of section eighteen hundred and ninety-one of the Revised Statutes of eighteen hundred and seventy-eight shall not apply to the Philippine Islands.

Future appointments of Civil Governor, Vice-Governor, members of said Commission, and heads of Executive Departments shall be made by the President, by and with the advice and consent of the Senate.

SEC. 2. That the action of the President of the United States heretofore taken by virtue of the authority vested in him as Commander in Chief of the Army and Navy, as set forth in his order of July twelfth, eighteen hundred and ninety-eight, whereby a tariff of duties and taxes as set forth by said order was to be levied and collected at all ports and places in the Philippine Islands upon passing into the occupation and possession of the forces of the United States, together with the subsequent amendments of said order, are hereby approved, ratified, and confirmed, and the actions of the authorities of the Government of the Philippine Islands, taken in accordance with the provisions of said order and subsequent amendments, are hereby approved: *Provided*, That nothing contained in this section shall be held to amend or repeal an Act entitled "An Act temporarily to provide revenue for the Philippine Islands, and for other purposes," approved March eighth, nineteen hundred and two.

SEC. 3. That the President of the United States, during such time as and whenever the sovereignty and authority of the United States encounter armed resistance in the Philippine Islands, until otherwise provided by Congress, shall continue to regulate and control commercial intercourse with and within said Islands by such general rules and regulations as he, in his discretion, may deem most conducive to the public interests and the general welfare.

SEC. 4. That all inhabitants of the Philippine Islands continuing to reside

therein who were Spanish subjects on the eleventh day of April, eighteen hundred and ninety-nine, and then resided in said Islands, and their children born subsequent thereto, shall be deemed and held to be citizens of the Philippine Islands and as such entitled to the protection of the United States, except such as shall have elected to preserve their allegiance to the Crown of Spain in accordance with the provisions of the treaty of peace between the United States and Spain signed at Paris December tenth, eighteen hundred and ninety-eight.

SEC. 5. That no law shall be enacted in said Islands which shall deprive any person of life, liberty, or property without due process of law, or deny to any person therein the equal protection of the laws.

That in all criminal prosecutions the accused shall enjoy the right to be heard by himself and counsel, to demand the nature and cause of the accusation against him, to have a speedy and public trial, to meet the witnesses face to face, and to have compulsory process to compel the attendance of witnesses in his behalf.

That no person shall be held to answer for a criminal offense without due process of law; and no person for the same offense shall be twice put in jeopardy of punishment, nor shall be compelled in any criminal case to be a witness against himself.

That all persons shall before conviction be bailable by sufficient sureties, except for capital offenses.

That no law impairing the obligation of contracts shall be enacted.

That no person shall be imprisoned for debt.

That the privilege of the writ of habeas corpus shall not be suspended, unless when in cases of rebellion, insurrection, or invasion the public safety may require it, in either of which events the same may be suspended by the President, or by the Governor, with the approval of the Philippine Commission, wherever during such period the necessity for such suspension shall exist.

That no ex post facto law or bill of attainder shall be enacted.

That no law granting a title of nobility shall be enacted, and no person holding any office of profit or trust in said Islands shall, without the consent of the Congress of the United States, accept any present, emolument, office, or title of any kind whatever from any king, queen, prince, or foreign State.

That excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishment inflicted.

That the right to be secure against unreasonable searches and seizures shall not be violated.

That neither slavery, nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist in said Islands.

That no law shall be passed abridging the freedom of speech or of the press, or the right of the people peaceably to assemble and petition the Government for redress of grievances.

That no law shall be made respecting an establishment of religion or prohibiting the free exercise thereof, and that the free exercise and enjoyment of religious profession and worship, without discrimination or preference, shall forever be allowed.

That no money shall be paid out of the Treasury except in pursuance of an appropriation by law.

That the rule of taxation in said Islands shall be uniform.

That no private or local bill which may be enacted into law shall embrace more than one subject, and that subject shall be expressed in the title of the bill.

That no warrant shall issue but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched and the person or things to be seized.

That all money collected on any tax levied or assessed for a special purpose shall be treated as a special fund in the Treasury and paid out for such purpose only.

SEC. 6. That whenever the existing insurrection in the Philippine Islands shall have ceased and a condition of general and complete peace shall have been established therein and the fact shall be certified to the President by the Philippine Commission, the President, upon being satisfied thereof, shall order a census of the Philippine Islands to be taken by said Philippine Commission; such census in its inquiries relating to the population shall take and make so far as practicable full report for all the inhabitants, of name, age, sex, race, or tribe, whether native or foreign born, literacy in Spanish, native dialect or language, or in English, school attendance, ownership of homes, industrial and social statistics, and such other information separately for each island, each province, and municipality, or other civil division, as the President and said Commission may deem necessary: *Provided*, That the President may, upon the request of said Commission, in his discretion, employ the service of the Census Bureau in compiling and promulgating the statistical information above provided for, and may commit to such Bureau any part or portion of such labor as to him may seem wise.

SEC. 7. That two years after the completion and publication of the census, in case such condition of general and complete peace with recognition of the authority of the United States shall have continued in the territory of said Islands not inhabited by Moros or other non-Christian tribes and such facts shall have been certified to the President by the Philippine Commission, the President upon being satisfied thereof shall direct said Commission to call, and the Commission shall call, a general election for the choice of delegates to a popular assembly of the people of said territory in the Philippine Islands, which shall be known as the Philippine Assembly. After said Assembly shall have convened and organized, all the legislative power heretofore conferred on the Philippine Commission in all that part of said Islands not inhabited by Moros or other non-Christian tribes shall be vested in a legislature consisting of two houses—the Philippine Commission and the Philippine Assembly. Said Assembly shall consist of not less than fifty nor more than one hundred members to be apportioned by said Commission among the provinces as nearly as practicable according to population: *Provided*, That no province shall have less than one member: *And provided further*, That provinces entitled by population to more than one member may be divided into such convenient districts as the said Commission may deem best.

Public notice of such division shall be given at least ninety days prior to such election, and the election shall be held under rules and regulations to be prescribed by law. The qualification of electors in such election shall be the same as is now provided by law in case of electors in municipal elections. The members of Assembly shall hold office for two years from the first day of January next following their election, and their successors shall be chosen by the people every second year thereafter. No person shall be eligible to such election who is not a qualified elector of the election district in which he may be chosen, owing allegiance to the United States, and twenty-five years of age.

The Legislature shall hold annual sessions, commencing on the first Monday of February in each year and continuing not exceeding ninety days thereafter (Sundays and holidays not included): *Provided*, That the first meeting of the Legislature shall be held upon the call of the Governor within ninety days after the first election: *And provided further*, That if at the termination of any session the appropriations necessary for the support of government shall not have been made, an amount equal to the sums appropriated in the last appropriation bills for such purposes shall be deemed to be appropriated; and until the Legislature



shall act in such behalf the Treasurer may, with the advice of the Governor, make the payments necessary for the purposes aforesaid.

The legislature may be called in special session at any time by the Civil Governor for general legislation, or for action on such specific subjects as he may designate. No special session shall continue longer than thirty days, exclusive of Sundays.

The Assembly shall be the judge of the elections, returns, and qualifications of its members. A majority shall constitute a quorum to do business, but a smaller number may adjourn from day to day and may be authorized to compel the attendance of absent members. It shall choose its speaker and other officers, and the salaries of its members and officers shall be fixed by law. It may determine the rule of its proceedings, punish its members for disorderly behavior, and with the concurrence of two-thirds expel a member. It shall keep a journal of its proceedings, which shall be published, and the yeas and nays of the members on any question shall, on the demand of one-fifth of those present, be entered on the journal.

SEC. 8. That at the same time with the first meeting of the Philippine Legislature, and biennially thereafter, there shall be chosen by said Legislature, each House voting separately, two resident commissioners to the United States, who shall be entitled to an official recognition as such by all departments upon presentation to the president of a certificate of election by the Civil Governor of said Islands, and each of whom shall be entitled to a salary payable monthly by the United States at the rate of five thousand dollars per annum, and two thousand dollars additional to cover all expenses: *Provided*, That no person shall be eligible to such election who is not a qualified elector of said Islands, owing allegiance to the United States, and who is not thirty years of age.

SEC. 9. That the Supreme Court and the Courts of First Instance of the Philippine Islands shall possess and exercise jurisdiction as heretofore provided and such additional jurisdiction as shall hereafter be prescribed by the Government of said Islands, subject to the power of said Government to change the practice and method of procedure. The municipal courts of said Islands shall possess and exercise jurisdiction as heretofore provided by the Philippine Commission, subject in all matters to such alteration and amendment as may be hereafter enacted by law; and the Chief Justice and associate justices of the Supreme Court shall hereafter be appointed by the President, by and with the advice and consent of the Senate, and shall receive the compensation heretofore prescribed by the Commission until otherwise provided by Congress. The judges of the Court of First Instance shall be appointed by the Civil Governor, by and with the advice and consent of the Philippine Commission: *Provided*, That the admiralty jurisdiction of the Supreme Court and Courts of First Instance shall not be changed except by Act of Congress.

SEC. 10. That the Supreme Court of the United States shall have jurisdiction to review, revise, reverse, modify, or affirm the final judgments and decrees of the Supreme Court of the Philippine Islands in all actions, cases, causes, and proceedings now pending therein or hereafter determined thereby in which the Constitution or any statute, treaty, title, right, or privilege of the United States is involved, or in causes in which the value in controversy exceeds twenty-five thousand dollars, or in which the title or possession of real estate exceeding in value the sum of twenty-five thousand dollars, to be ascertained by the oath of either party or of other competent witnesses, is involved or brought in question; and such final judgments or decrees may and can be reviewed, revised, reversed, modified, or affirmed by said Supreme Court of the United States on appeal or writ of error by the party aggrieved, in the same manner, under the same regulations, and by the same procedure, as far as applicable, as the final judgments and decrees of the circuit courts of the United States.

SEC. 11. That the Government of the Philippine Islands is hereby authorized to provide for the needs of commerce by improving the harbors and navigable waters of said Islands and to construct and maintain in said navigable waters and upon the shore adjacent thereto bonded warehouses, wharves, piers, light-houses, signal and life-saving stations, buoys, and like instruments of commerce, and to adopt and enforce regulations in regard thereto, including bonded warehouses wherein articles not intended to be imported into said Islands nor mingled with the property therein, but brought into a port of said Islands for reshipment to another country, may be deposited in bond and reshipped to another country without the payment of customs duties or charges.

SEC. 12. That all the property and rights which may have been acquired in the Philippine Islands by the United States under the treaty of peace with Spain, signed December tenth, eighteen hundred and ninety-eight, except such land or other property as shall be designated by the President of the United States for military and other reservations of the Government of the United States, are hereby placed under the control of the Government of said Islands to be administered for the benefit of the inhabitants thereof, except as provided in this Act.

SEC. 13. That the Government of the Philippine Islands, subject to the provisions of this Act and except as herein provided, shall classify according to its agricultural character and productiveness, and shall immediately make rules and regulations for the lease, sale, or other disposition of the public lands other than timber or mineral lands, but such rules and regulations shall not go into effect or have the force of law until they have received the approval of the President, and when approved by the President they shall be submitted by him to Congress at the beginning of the next ensuing session thereof, and unless disapproved or amended by Congress at said session they shall at the close of such period have the force and effect of law in the Philippine Islands: *Provided*, That a single homestead entry shall not exceed sixteen hectares in extent.

SEC. 14. That the Government of the Philippine Islands is hereby authorized and empowered to enact rules and regulations and to prescribe terms and conditions to enable persons to perfect their title to public lands in said Islands, who, prior to the transfer of sovereignty from Spain to the United States, had fulfilled all or some of the conditions required by the Spanish laws and royal decrees of the Kingdom of Spain for the acquisition of legal title thereto, yet failed to secure conveyance of title; and the Philippine Commission is authorized to issue patents, without compensation, to any native of said Islands, conveying title to any tract of land not more than sixteen hectares in extent, which were public lands and had been actually occupied by such native or his ancestors prior to and on the thirteenth of August, eighteen hundred and ninety-eight.

SEC. 15. That the Government of the Philippine Islands is hereby authorized and empowered, on such terms as it may prescribe, by general legislation, to provide for the granting or sale and conveyance to actual occupants and settlers and other citizens of said Islands such parts and portions of the public domain, other than timber and mineral lands, of the United States in said Islands as it may deem wise, not exceeding sixteen hectares to any one person, and for the sale and conveyance of not more than one thousand and twenty-four hectares to any corporation or association of persons: *Provided*, That the grant or sale of such lands, whether the purchase price be paid at once or in partial payments, shall be conditioned upon actual and continued occupancy, improvement, and cultivation of the premises sold for a period of not less than five years, during which time the purchaser or grantee can not alienate or encumber said land or the title thereto; but such restriction shall not apply to transfers of rights and title of inheritance under the laws for the distribution of the estates of decedents.

SEC. 16. That in granting or selling any part of the public domain under the provisions of the last preceding section, preference in all cases shall be given to

actual occupants and settlers; and such public lands of the United States in the actual possession or occupancy of any native of the Philippine Islands shall not be sold by said Government to any other person without the consent thereto of said prior occupant or settler first had and obtained: *Provided*, That the prior right hereby secured to an occupant of land, who can show no other proof of title than possession, shall not apply to more than sixteen hectares in any one tract.

SEC. 17. That timber, trees, forest, and forest products on lands leased or demised by the Government of the Philippine Islands under the provisions of this Act shall not be cut, destroyed, removed, or appropriated except by special permission of said Government and under such regulations as it may prescribe.

All moneys obtained from lease or sale of any portion of the public domain or from licenses to cut timber by the Government of the Philippine Islands shall be covered into the Insular Treasury and be subject only to appropriation for insular purposes according to law.

SEC. 18. That the forest laws and regulations now in force in the Philippine Islands, with such modifications and amendments as may be made by the Government of said Islands, are hereby continued in force, and no timber lands forming part of the public domain shall be sold, leased, or entered until the Government of said Islands, upon the certification of the Forestry Bureau that said lands are more valuable for agriculture than for forest uses, shall declare such lands so certified to be agricultural in character: *Provided*, That the said Government shall have the right and is hereby empowered to issue licenses to cut, harvest, or collect timber or other forest products on reserved or unreserved public lands in said Islands in accordance with the forest laws and regulations hereinbefore mentioned and under the provisions of this Act, and the said Government may lease land to any person or persons holding such licenses, sufficient for a mill site, not to exceed four hectares in extent, and may grant rights of way to enable such person or persons to get access to the lands to which such licenses apply.

SEC. 19. That the beneficial use shall be the basis, the measure, and the limit of all rights to water in said Islands, and the Government of said Islands is hereby authorized to make such rules and regulations for the use of water, and to make such reservations of public lands for the protection of the water supply, and for other public purposes not in conflict with the provisions of this Act, as it may deem best for the public good.

#### MINERAL LANDS.

SEC. 20. That in all cases public lands in the Philippine Islands valuable for minerals shall be reserved from sale, except as otherwise expressly directed by law.

SEC. 21. That all valuable mineral deposits, in public lands in the Philippine Islands, both surveyed and unsurveyed, are hereby declared to be free and open to exploration, occupation, and purchase, and the land in which they are found to occupation and purchase, by citizens of the United States, or of said Islands: *Provided*, That when on any lands in said Islands entered and occupied as agricultural lands under the provisions of this Act, but not patented, mineral deposits have been found, the working of such mineral deposits is hereby forbidden until the person, association, or corporation who or which has entered and is occupying such lands shall have paid to the Government of said Islands such additional sum or sums as will make the total amount paid for the mineral claim or claims in which said deposits are located equal to the amount charged by the Government for the same as mineral claims.

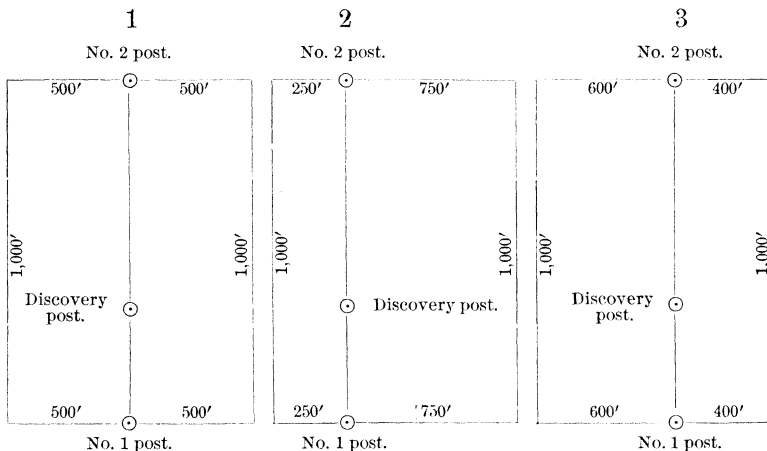
SEC. 22. That mining claims upon land containing veins or lodes of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other

valuable deposits, located after the passage of this Act, whether located by one or more persons qualified to locate the same under the preceding section, shall be located in the following manner and under the following conditions: Any person so qualified desiring to locate a mineral claim shall, subject to the provisions of this Act with respect to land which may be used for mining, enter upon the same and locate a plot of ground measuring, where possible, but not exceeding, one thousand feet in length by one thousand feet in breadth, in as nearly as possible a rectangular form; that is to say: All angles shall be right angles, except in cases where a boundary line of a previously surveyed claim is adopted as common to both claims, but the lines need not necessarily be meridional. In defining the size of a mineral claim, it shall be measured horizontally, irrespective of inequalities of the surface of the ground.

SEC. 23. That a mineral claim shall be marked by two posts placed as nearly as possible on the line of the ledge or vein, and the posts shall be numbered one and two, and the distance between posts numbered one and two shall not exceed one thousand feet, the line between posts numbered one and two to be known as the location line; and upon posts numbered one and two shall be written the name given to the mineral claim, the name of the locator, and the date of the location. Upon post numbered one there shall be written, in addition to the foregoing, "Initial post," the approximate compass bearing of post numbered two, and a statement of the number of feet lying to the right and to the left of the line from post numbered one to post numbered two, thus: "Initial post. Direction of post numbered two. ——— feet of this claim lie on the right and ——— feet on the left of the line from number one to number two post." All the particulars required to be put on number one and number two posts shall be furnished by the locator to the provincial secretary, or such other officer as by the Philippine Government may be described as mining recorder, in writing, at the time the claim is recorded, and shall form a part of the record of such claim.

SEC. 24. That when a claim has been located the holder shall immediately mark the line between posts numbered one and two so that it can be distinctly seen. The locator shall also place a post at the point where he has found minerals in place, on which shall be written "Discovery post": *Provided*, That when the claim is surveyed the surveyor shall be guided by the records of the claim, the sketch plan on the back of the declaration made by the owner when the claim was recorded, posts numbered one and two, and the notice on number one, the initial post.

#### EXAMPLES OF VARIOUS MODES OF LAYING CLAIMS.



SEC. 25. That it shall not be lawful to move number one post, but number two post may be moved by the deputy mineral surveyor when the distance between posts numbered one and two exceeds one thousand feet, in order to place number two post one thousand feet from number one post on the line of location. When the distance between posts numbered one and two is less than one thousand feet the deputy mineral surveyor shall have no authority to extend the claim beyond number two.

SEC. 26. That the "location line" shall govern the direction of one side of the claim, upon which the survey shall be extended according to this Act.

SEC. 27. That the holder of a mineral claim shall be entitled to all minerals which may lie within his claim, but he shall not be entitled to mine outside the boundary lines of his claim continued vertically downward: *Provided*, That this Act shall not prejudice the rights of claim owners nor claim holders whose claims have been located under existing laws prior to this Act.

SEC. 28. That no mineral claim of the full size shall be recorded without the application being accompanied by an affidavit made by the applicant or some person on his behalf cognizant of the facts—that the legal notices and posts have been put up; that mineral has been found in place on the claim proposed to be recorded; that the ground applied for is unoccupied by any other person. In the said declaration shall be set out the name of the applicant and the date of the location of the claim. The words written on the number one and number two posts shall be set out in full, and as accurate a description as possible of the position of the claim given with reference to some natural object or permanent monuments.

SEC. 29. That no mineral claim which at the date of its record is known by the locator to be less than a full-sized mineral claim shall be recorded without the word "fraction" being added to the name of the claim, and the application being accompanied by an affidavit or solemn declaration made by the applicant or some person on his behalf cognizant of the facts: That the legal posts and notices have been put up; that mineral has been found in place on the fractional claim proposed to be recorded; that the ground applied for is unoccupied by any other person. In the said declaration shall be set out the name of the applicant and the date of the location of the claim. The words written on the posts numbered one and two shall be set out in full, and as accurate a description as possible of the position of the claim given. A sketch plan shall be drawn by the applicant on the back of the declaration, showing as near as may be the position of the adjoining mineral claims and the shape and size, expressed in feet, of the claim or fraction desired to be recorded: *Provided*, That the failure on the part of the locator of a mineral claim to comply with any of the foregoing provisions of this section shall not be deemed to invalidate such location, if upon the facts it shall appear that such locator has actually discovered mineral in place on said location, and that there has been on his part a bona fide attempt to comply with the provisions of this Act, and that the nonobservance of the formalities hereinbefore referred to is not of a character calculated to mislead other persons desiring to locate claims in the vicinity.

SEC. 30. That in cases where, from the nature or shape of the ground, it is impossible to mark the location line of the claim as provided by this Act then the claim may be marked by placing posts as nearly as possible to the location line, and noting the distance and direction such posts may be from such location line, which distance and direction shall be set out in the record of the claim.

SEC. 31. That every person locating a mineral claim shall record the same with the provincial secretary or such other officer as by the Government of the Philippine Islands may be described as mining recorder of the district within which

the same is situate, within thirty days after the location thereof. Such record shall be made in a book to be kept for the purpose in the office of the said provincial secretary or such other officer as by said Government described as mining recorder, in which shall be inserted the name of the claim, the name of each locator, locality of the mine, the direction of the location line, the length in feet, the date of location, and the date of the record. A claim which shall not have been recorded within the prescribed period shall be deemed to have been abandoned.

SEC. 32. That in case of any dispute as to the location of a mineral claim the title to the claim shall be recognized according to the priority of such location, subject to any question as to the validity of the record itself and subject to the holder having complied with all the terms and conditions of this Act.

SEC. 33. That no holder shall be entitled to hold in his, its, or their own name or in the name of any other person, corporation, or association more than one mineral claim on the same vein or lode.

SEC. 34. That a holder may at any time abandon any mineral claim by giving notice, in writing, of such intention to abandon, to the provincial secretary or such other officer as by the Government of the Philippine Islands may be described as mining recorder; and from the date of the record of such notice all his interest in such claim shall cease.

SEC. 35. That proof of citizenship under the clauses of this Act relating to mineral lands may consist, in the case of an individual, of his own affidavit thereof; in the case of an association of persons unincorporated, of the affidavit of their authorized agent, made on his own knowledge or upon information and belief; and in the case of a corporation organized under the laws of the United States, or of any State or Territory thereof, or of the Philippine Islands, by the filing of a certified copy of their charter or certificate of incorporation.

SEC. 36. That the United States Philippine Commission or its successors may make regulations, not in conflict with the provisions of this Act, governing the location, manner of recording, and amount of work necessary to hold possession of a mining claim, subject to the following requirements:

On each claim located after the passage of this Act, and until a patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year: *Provided*, That upon a failure to comply with these conditions the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made, provided that the original locators, their heirs, assigns, or legal representatives have not resumed work upon the claim after failure and before such location. Upon the failure of any one of several coöwners to contribute his proportion of the expenditures required thereby, the coöwners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent coöwner personal notice in writing, or notice by publication in the newspaper published nearest the claim, and in two newspapers published at Manila, one in the English language and the other in the Spanish language, to be designated by the Chief of the Philippine Insular Bureau of Public Lands, for at least once a week for ninety days, and if, at the expiration of ninety days after such notice in writing or by publication, such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section his interest in the claim shall become the property of his coöwners who have made the required expenditures. The period within which the work required to be done annually on all unpatented mineral claims shall commence on the first day of January succeeding the date of location of such claim.

SEC. 37. That a patent for any land claimed and located for valuable mineral

deposits may be obtained in the following manner: Any person, association, or corporation authorized to locate a claim under this Act, having claimed and located a piece of land for such purposes, who has or have complied with the terms of this Act, may file in the office of the provincial secretary, or such other officer as by the Government of said Islands may be described as mining recorder of the province wherein the land claimed is located, an application for a patent, under oath, showing such compliance, together with a plat and field notes of the claim or claims in common, made by or under the direction of the Chief of the Philippine Insular Bureau of Public Lands, showing accurately the boundaries of the claim, which shall be distinctly marked by monuments on the ground, and shall post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land embraced in such plat previous to the filing of the application for a patent, and shall file an affidavit of at least two persons that such notice has been duly posted, and shall file a copy of the notice in such office, and shall thereupon be entitled to a patent for the land, in the manner following: The provincial secretary, or such other officer as by the Philippine Government may be described as mining recorder, upon the filing of such application, plat, field notes, notices, and affidavits, shall publish a notice that such an application has been made, once a week for the period of sixty days, in a newspaper to be by him designated as nearest to such claim and in two newspapers published at Manila, one in the English language and one in the Spanish language, to be designated by the Chief of the Philippine Insular Bureau of Public Lands; and he shall also post such notice in his office for the same period. The claimant at the time of filing this application, or at any time thereafter within the sixty days of publication, shall file with the provincial secretary or such other officer as by the Philippine Government may be described as mining recorder a certificate of the Chief of the Philippine Insular Bureau of Public Lands that five hundred dollars' worth of labor has been expended or improvements made upon the claim by himself or grantors; that the plat is correct, with such further description by such reference to natural objects or permanent monuments as shall identify the claim, and furnish an accurate description to be incorporated in the patent. At the expiration of the sixty days of publication the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication. If no adverse claim shall have been filed with the provincial secretary or such other officer as by the Government of said Islands may be described as mining recorder at the expiration of the sixty days of publication, it shall be assumed that the applicant is entitled to a patent upon the payment to the provincial treasurer or the collector of internal revenue of five dollars per acre and that no adverse claim exists, and thereafter no objection from third parties to the issuance of a patent shall be heard, except it be shown that the applicant has failed to comply with the terms of this Act: *Provided*, That where the claimant for a patent is not a resident of or within the province wherein the land containing the vein, ledge, or deposit sought to be patented is located, the application for patent and the affidavits required to be made in this section by the claimant for such patent may be made by his, her, or its authorized agent where said agent is conversant with the facts sought to be established by said affidavits.

SEC. 38. That applicants for mineral patents, if residing beyond the limits of the province or military department wherein the claim is situated, may make the oath or affidavit required for proof of citizenship before the clerk of any court of record, or before any notary public of any province of the Philippine Islands, or any other official in said Islands authorized by law to administer oaths.

SEC. 39. That where an adverse claim is filed during the period of publication

it shall be upon oath of the person or persons making the same, and shall show the nature, boundaries, and extent of such adverse claim, and all proceedings, except the publication of notice and making and filing of the affidavits thereof, shall be stayed until the controversy shall have been settled or decided by a court of competent jurisdiction or the adverse claim waived. It shall be the duty of the adverse claimant, within thirty days after filing his claim, to commence proceedings in a court of competent jurisdiction to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment, and a failure so to do shall be a waiver of his adverse claim. After such judgment shall have been rendered the party entitled to the possession of the claim, or any portion thereof, may, without giving further notice, file a certified copy of the judgment roll with the provincial secretary or such other officer as by the Government of the Philippine Islands may be described as mining recorder, together with the certificate of the Chief of the Philippine Insular Bureau of Public Lands that the requisite amount of labor has been expended or improvements made thereon, and the description required in other cases, and shall pay to the provincial treasurer or the collector of internal revenue of the province in which the claim is situated, as the case may be, five dollars per acre for his claim, together with the proper fees, whereupon the whole proceedings and the judgment roll shall be certified by the provincial secretary or such other officer as by said Government may be described as mining recorder to the Secretary of the Interior of the Philippine Islands, and a patent shall issue thereon for the claim, or such portion thereof as the applicant shall appear, from the decision of the court, rightly to possess. The adverse claim may be verified by the oath of any duly authorized agent or attorney in fact of the adverse claimant cognizant of the facts stated; and the adverse claimant, if residing or at the time being beyond the limits of the province wherein the claim is situated, may make oath to the adverse claim before the clerk of any court of record, or any notary public of any province or military department of the Philippine Islands, or any other officer authorized to administer oaths where the adverse claimant may then be. If it appears from the decision of the court that several parties are entitled to separate and different portions of the claim, each party may pay for his portion of the claim, with the proper fees, and file the certificate and description by the Chief of the Philippine Insular Bureau of Public Lands, whereupon the provincial secretary or such other officer as by the Government of said Islands may be described as mining recorder shall certify the proceedings and judgment roll to the Secretary of the Interior for the Philippine Islands, as in the preceding case, and patents shall issue to the several parties according to their respective rights. If in any action brought pursuant to this section title to the ground in controversy shall not be established by either party, the court shall so find, and judgment shall be entered accordingly. In such case costs shall not be allowed to either party, and the claimant shall not proceed in the office of the provincial secretary or such other officer as by the Government of said Islands may be described as mining recorder or be entitled to a patent for the ground in controversy until he shall have perfected his title. Nothing herein contained shall be construed to prevent the alienation of a title conveyed by a patent for a mining claim to any person whatever.

SEC. 40. That the description of mineral claims upon surveyed lands shall designate the location of the claim with reference to the lines of the public surveys, but need not conform therewith; but where a patent shall be issued for claims upon unsurveyed lands the Chief of the Philippine Insular Bureau of Public Lands in extending the surveys shall adjust the same to the boundaries of such



patented claim according to the plat or description thereof, but so as in no case to interfere with or change the location of any such patented claim.

SEC. 41. That any person authorized to enter lands under this Act may enter and obtain patent to lands that are chiefly valuable for building stone under the provisions of this Act relative to placer mineral claims.

SEC. 42. That any person authorized to enter lands under this Act may enter and obtain patent to lands containing petroleum or other mineral oils and chiefly valuable therefor under the provisions of this Act relative to placer mineral claims.

SEC. 43. That no location of a placer claim shall exceed sixty-four hectares for any association of persons, irrespective of the number of persons composing such association, and no such location shall include more than eight hectares for an individual claimant. Such location shall conform to the laws of the United States Philippine Commission, or its successors, with reference to public surveys, and nothing in this section contained shall defeat or impair any bona fide ownership of land for agricultural purposes or authorize the sale of the improvements of any bona fide settler to any purchaser.

SEC. 44. That where placer claims are located upon surveyed lands and conform to legal subdivisions, no further survey or plat shall be required, and all placer mining claims located after the date of passage of this Act shall conform as nearly as practicable to the Philippine system of public-land surveys and the regular subdivisions of such surveys; but where placer claims can not be conformed to legal subdivisions, survey and plat shall be made as on unsurveyed lands; and where by the segregation of mineral lands in any legal subdivision a quantity of agricultural land less than sixteen hectares shall remain, such fractional portion of agricultural land may be entered by any party qualified by law for homestead purposes.

SEC. 45. That where such person or association, they and their grantors have held and worked their claims for a period equal to the time prescribed by the statute of limitations of the Philippine Islands, evidence of such possession and working of the claims for such period shall be sufficient to establish a right to a patent thereto under this Act, in the absence of any adverse claim; but nothing in this Act shall be deemed to impair any lien which may have attached in any way whatever prior to the issuance of a patent.

SEC. 46. That the Chief of the Philippine Insular Bureau of Public Lands may appoint competent deputy mineral surveyors to survey mining claims. The expenses of the survey of vein or lode claims and of the survey of placer claims, together with the cost of publication of notices, shall be paid by the applicants, and they shall be at liberty to obtain the same at the most reasonable rates, and they shall also be at liberty to employ any such deputy mineral surveyor to make the survey. The Chief of the Philippine Insular Bureau of Public Lands shall also have power to establish the maximum charges for surveys and publication of notices under this Act; and in case of excessive charges for publication he may designate any newspaper published in a province where mines are situated, or in Manila, for the publication of mining notices and fix the rates to be charged by such paper; and to the end that the Chief of the Bureau of Public Lands may be fully informed on the subject such applicant shall file with the provincial secretary, or such other officer as by the Government of the Philippine Islands may be described as mining recorder, a sworn statement of all charges and fees paid by such applicant for publication and surveys, and of all fees and money paid the provincial treasurer or the collector of internal revenue, as the case may be, which statement shall be transmitted, with the other papers in the case, to the Secretary of the Interior for the Philippine Islands.

SEC. 47. That all affidavits required to be made under this Act may be verified

before any officer authorized to administer oaths within the province or military department where the claims may be situated, and all testimony and proofs may be taken before any such officer, and, when duly certified by the officer taking the same, shall have the same force and effect as if taken before the proper provincial secretary or such other officer as by the Government of the Philippine Islands may be described as mining recorder. In cases of contest as to the mineral or agricultural character of land the testimony and proofs may be taken as herein provided on personal notice of at least ten days to the opposing party; or if such party can not be found, then by publication at least once a week for thirty days in a newspaper to be designated by the provincial secretary or such other officer as by said Government may be described as mining recorder published nearest to the location of such land and in two newspapers published in Manila, one in the English language and one in the Spanish language, to be designated by the Chief of the Philippine Insular Bureau of Public Lands; and the provincial secretary or such other officer as by said Government may be described as mining recorder shall require proofs that such notice has been given.

SEC. 48. That where nonmineral land not contiguous to the vein or lode is used or occupied by the proprietor of such vein or lode for mining or milling purposes, such nonadjacent surface ground may be embraced and included in an application for a patent for such vein or lode, and the same may be patented therewith, subject to the same preliminary requirements as to survey and notice as are applicable to veins or lodes; but no location of such nonadjacent land shall exceed two hectares, and payment for the same must be made at the same rate as fixed by this Act for the superficies of the lode. The owner of a quartz mill or reduction works not owning a mine in connection therewith may also receive a patent for his mill site as provided in this section.

SEC. 49. That as a condition of sale the Government of the Philippine Islands may provide rules for working, policing, and sanitation of mines, and rules concerning easements, drainage, water rights, right of way, right of Government survey and inspection, and other necessary means to their complete development not inconsistent with the provisions of this Act, and those conditions shall be fully expressed in the patent. The Philippine Commission or its successors are hereby further empowered to fix the bonds of deputy mineral surveyors.

SEC. 50. That whenever by priority of possession rights to the use of water for mining, agricultural, manufacturing, or other purposes have vested and accrued and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same, and the right of way for the construction of ditches and canals for the purposes herein specified is acknowledged and confirmed, but whenever any person, in the construction of any ditch or canal, injures or damages the possession of any settler on the public damoin, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

SEC. 51. That all patents granted shall be subject to any vested and accrued water rights, or rights to ditches and reservoirs used in connection with such water rights as may have been acquired under or recognized by the preceding section.

SEC. 52. That the Government of the Philippine Islands is authorized to establish land districts and provide for the appointment of the necessary officers wherever they may deem the same necessary for the public convenience, and to further provide that in districts where land offices are established proceedings required by this Act to be had before provincial officers shall be had before the proper officers of such land offices.

SEC. 53. That every person above the age of twenty-one years who is a citizen of the United States, or of the Philippine Islands, or who has acquired the rights of a native of said Islands under and by virtue of the Treaty of Paris, or any association of persons severally qualified as above, shall, upon application to the proper provincial treasurer, have the right to enter any quality of vacant coal lands of said Islands not otherwise appropriated or reserved by competent authority, not exceeding sixty-four hectares to such individual person, or one hundred and twenty-eight hectares to such association, upon payment to the provincial treasurer or the collector of internal revenue, as the case may be, of not less than twenty-five dollars per hectare for such lands, where the same shall be situated more than fifteen miles from any completed railroad or available harbor or navigable stream, and not less than fifty dollars per hectare for such lands as shall be within fifteen miles of such road, harbor, or stream: *Provided*, That such entries shall be taken in squares of sixteen or sixty-four hectares, in conformity with the rules and regulations governing the public-land surveys of the said Islands in plotting legal subdivisions.

SEC. 54. That any person or association of persons, severally qualified as above provided, who have opened and improved, or shall hereafter open and improve, any coal mine or mines upon the public lands, and shall be in actual possession of the same, shall be entitled to a preference right of entry under the preceding section of the mines so opened and improved.

SEC. 55. That all claims under the preceding section must be presented to the proper provincial secretary within sixty days after the date of actual possession and the commencement of improvements on the land by the filing of a declaratory statement therefor; and where the improvements shall have been made prior to the expiration of three months from the date of the passage of this Act, sixty days from the expiration of such three months shall be allowed for the filing of a declaratory statement; and no sale under the provisions of this Act shall be allowed until the expiration of six months from the date of the passage of this Act.

SEC. 56. That the three preceding sections shall be held to authorize only one entry by the same person or association of persons; and no association of persons, any member of which shall have taken the benefit of such sections, either as an individual or as a member of any other association, shall enter or hold any other lands under the provisions thereof; and no member of any association which shall have taken the benefit of such section shall enter or hold any other lands under their provisions; and all persons claiming under section fifty-eight shall be required to prove their respective rights and pay for the lands filed upon within one year from the time prescribed for filing their respective claims; and upon failure to file the proper notice or to pay for the land within the required period, the same shall be subject to entry by any other qualified applicant.

SEC. 57. That in case of conflicting claims upon coal lands where the improvements shall be commenced after the date of the passage of this Act, priority of possession and improvement, followed by proper filing and continued good faith, shall determine the preference right to purchase. And also where improvements have already been made prior to the passage of this Act, division of the land claimed may be made by legal subdivisions, which shall conform as nearly as practicable with the subdivisions of land provided for in this Act, to include as near as may be the valuable improvements of the respective parties. The Government of the Philippine Islands is authorized to issue all needful rules and regulations for carrying into effect the provisions of this and preceding sections relating to mineral lands.

SEC. 58. That whenever it shall be made to appear to the secretary of any

province or the commander of any military department in the Philippine Islands that any lands within the province are saline in character, it shall be the duty of said provincial secretary or commander, under the regulations of the Government of the Philippine Islands, to take testimony in reference to such lands, to ascertain their true character, and to report the same to the Secretary of the Interior for the Philippine Islands; and if, upon such testimony, the Secretary of the Interior shall find that such lands are saline and incapable of being purchased under any of the laws relative to the public domain, then and in such case said lands shall be offered for sale at the office of the provincial secretary or such other officer as by the said Government may be described as mining recorder of the province or department in which the same shall be situated, as the case may be, under such regulations as may be prescribed by said Government and sold to the highest bidder, for cash, at a price of not less than three dollars per hectare; and in case such lands fail to sell when so offered, then the same shall be subject to private sale at such office, for cash, at a price not less than three dollars per hectare, in the same manner as other lands in the said Islands are sold. All executive proclamations relating to the sales of public saline lands shall be published in only two newspapers, one printed in the English language and one in the Spanish language, at Manila, which shall be designated by said Secretary of the Interior.

SEC. 59. That no Act granting lands to provinces, districts, or municipalities to aid in the construction of roads, or for other public purposes, shall be so construed as to embrace mineral lands, which, in all cases, are reserved exclusively, unless otherwise specially provided in the Act or Acts making the grant.

SEC. 60. That nothing in this Act shall be construed to affect the rights of any person, partnership, or corporation having a valid, perfected mining concession granted prior to April eleventh, eighteen hundred and ninety-nine, but all such concessions shall be conducted under the provisions of the law in force at the time they were granted, subject at all times to cancellation by reason of illegality in the procedure by which they were obtained, or for failure to comply with the conditions prescribed as requisite to their retention in the laws under which they were granted: *Provided*, That the owner or owners of every such concession shall cause the corners made by its boundaries to be distinctly marked with permanent monuments within six months after this Act has been promulgated in the Philippine Islands, and that any concessions the boundaries of which are not so marked within this period shall be free and open to explorations and purchase under the provisions of this Act.

SEC. 61. That mining rights on public lands in the Philippine Islands shall, after the passage of this Act, be acquired only in accordance with its provisions.

SEC. 62. That all proceedings for the cancellation of perfected Spanish concessions shall be conducted in the courts of the Philippine Islands having jurisdiction of the subject-matter and of the parties, unless the United States Philippine Commission, or its successors, shall create special tribunals for the determination of such controversies.

**AUTHORITY FOR THE PHILIPPINE ISLANDS GOVERNMENT TO PURCHASE LANDS OF RELIGIOUS ORDERS AND OTHERS AND ISSUE BONDS FOR PURCHASE PRICE.**

SEC. 63. That the Government of the Philippine Islands is hereby authorized, subject to the limitations and conditions prescribed in this Act, to acquire, receive, hold, maintain, and convey title to real and personal property, and may acquire real estate for public uses by the exercise of the right of eminent domain.

SEC. 64. That the powers hereinbefore conferred in section sixty-three may also be exercised in respect of any lands, easements, appurtenances, and hereditaments which, on the thirteenth of August, eighteen hundred and ninety-eight, were

owned or held by associations, corporations, communities, religious orders, or private individuals in such large tracts or parcels and in such manner as in the opinion of the Commission injuriously to affect the peace and welfare of the people of the Philippine Islands. And for the purpose of providing funds to acquire the lands mentioned in this section said Government of the Philippine Islands is hereby empowered to incur indebtedness, to borrow money, and to issue, and to sell at not less than par value, in gold coin of the United States of the present standard value or the equivalent in value in money of said Islands, upon such terms and conditions as it may deem best, registered or coupon bonds of said Government for such amount as may be necessary, said bonds to be in denominations of fifty dollars or any multiple thereof, bearing interest at a rate not exceeding four and a half per centum per annum, payable quarterly, and to be payable at the pleasure of said Government after dates named in said bonds not less than five nor more than thirty years from the date of their issue, together with interest thereon, in gold coin of the United States of the present standard value or the equivalent in value in money of said Islands; and said bonds shall be exempt from the payment of all taxes or duties of said Government, or any local authority therein, or of the Government of the United States, as well as from taxation in any form by or under State, municipal, or local authority in the United States or the Philippine Islands. The moneys which may be realized or received from the issue and sale of said bonds shall be applied by the Government of the Philippine Islands to the acquisition of the property authorized by this section, and to no other purposes.

SEC. 65. That all lands acquired by virtue of the preceding section shall constitute a part and portion of the public property of the Government of the Philippine Islands, and may be held, sold, and conveyed, or leased temporarily for a period not exceeding three years after their acquisition by said Government on such terms and conditions as it may prescribe, subject to the limitations and conditions provided for in this Act: *Provided*, That all deferred payments and the interest thereon shall be payable in the money prescribed for the payment of principal and interest of the bonds authorized to be issued in payment of said lands by the preceding section and said deferred payments shall bear interest at the rate borne by the bonds. All moneys realized or received from sales or other disposition of said lands or by reason thereof shall constitute a trust fund for the payment of principal and interest of said bonds, and also constitute a sinking fund for the payment of said bonds at their maturity. Actual settlers and occupants at the time said lands are acquired by the Government shall have the preference over all others to lease, purchase, or acquire their holdings within such reasonable time as may be determined by said Government.

#### MUNICIPAL BONDS FOR PUBLIC IMPROVEMENTS.

SEC. 66. That for the purpose of providing funds to construct sewers, to furnish adequate sewer and drainage facilities, to secure a sufficient supply of water, and to provide all kinds of municipal betterments and improvements in municipalities, the Government of the Philippine Islands, under such limitations, terms, and conditions as it may prescribe, with the consent and approval of the President and the Congress of the United States, may permit any municipality of said Islands to incur indebtedness, borrow money, and to issue and sell (at not less than par value in gold coin of the United States) registered or coupon bonds in such amount and payable at such time as may be determined by the Government of said Islands, with interest thereon not to exceed five per centum per annum: *Provided*, That the entire indebtedness of any municipality under this section shall not exceed five per centum of the assessed valuation of the property in said

municipality, and any obligation in excess of such limit shall be null and void.

SEC. 67. That all municipal bonds shall be in denominations of fifty dollars, or any multiple thereof, bearing interest at a rate not exceeding five per centum per annum, payable quarterly, such bonds to be payable at the pleasure of the Government of the Philippine Islands, after dates named in said bonds not less than five nor more than thirty years from the date of their issue, together with the interest thereon, in gold coin of the United States of the present standard value, or its equivalent in value in money of the said Islands; and said bonds shall be exempt from the payment of all taxes or duties of the Government of the Philippine Islands, or any local authority therein, or the Government of the United States.

SEC. 68. That all moneys which may be realized or received from the issue and sale of said bonds shall be utilized under authorization of the Government of the Philippine Islands in providing the municipal improvements and betterment which induced the issue and sale of said bonds, and for no other purpose.

SEC. 69. That the Government of the Philippine Islands shall, by the levy and collection of taxes on the municipality, its inhabitants and their property, or by other means, make adequate provision to meet the obligation of the bonds of such municipality, and shall create a sinking fund sufficient to retire them and pay the interest thereon in accordance with the terms of issue: *Provided*, That if said bonds or any portion thereof shall be paid out of the funds of the Government or said Islands, such municipality shall reimburse said Government for the sum thus paid, and said Government is hereby empowered to collect said sum by the levy and collection of taxes on such municipality.

SEC. 70. That for the purpose of providing funds to construct sewers in the city of Manila and to furnish it with an adequate sewer and drainage system and supply of water the Government of the Philippine Islands, with the approval of the President of the United States first had, is hereby authorized to permit the city of Manila to incur indebtedness, to borrow money, and to issue and sell (at not less than par value in gold coin of the United States), upon such terms and conditions as it may deem best, registered or coupon bonds of the city of Manila to an amount not exceeding four million dollars lawful money of the United States, payable at such time or times as may be determined by said Government, with interest thereon not to exceed five per centum per annum.

SEC. 71. That said coupon or registered bonds shall be in denominations of fifty dollars or any multiple thereof, bearing interest at a rate not exceeding five per centum per annum, payable quarterly, such bonds to be payable at the pleasure of the Government of the Philippine Islands, after dates named in said bonds not less than five nor more than thirty years from the date of their issue, together with the interest thereon in gold coin of the United States of the present standard value, or the equivalent in value in money of the said Islands; and said bonds shall be exempt from the payment of all taxes or duties of the Government of the said Islands, or of any local authority therein, or of the Government of the United States.

SEC. 72. That all moneys which may be realized or received from the issue and sale of said bonds shall be utilized under authorization of said Government of the Philippine Islands in providing a suitable sewer and drainage system and adequate supply of water for the city of Manila and for no other purpose.

SEC. 73. That the Government of the Philippine Islands shall, by the levy and collection of taxes on the city of Manila, its inhabitants and their property, or by other means, make adequate provision to meet the obligation of said bonds and shall create a sinking fund sufficient to retire them and pay the interest thereon in accordance with the terms of issue: *Provided*, That if said bonds or any por-

tion thereof shall be paid out of the funds of the Government of said Islands, said city shall reimburse said Government for the sum thus paid, and said Government is hereby empowered to collect said sum by the levy and collection of taxes on said city.

#### FRANCHISES.

SEC. 74. That the Government of the Philippine Islands may grant franchises, privileges, and concessions, including the authority to exercise the right of eminent domain for the construction and operation of works of public utility and service, and may authorize said works to be constructed and maintained over and across the public property of the United States, including streets, highways, squares, and reservations, and over similar property of the Government of said Islands, and may adopt rules and regulations under which the provincial and municipal governments of the Islands may grant the right to use and occupy such public property belonging to said provinces or municipalities: *Provided*, That no private property shall be taken for any purpose under this section without just compensation paid or tendered therefor; and that such authority to take and occupy land shall not authorize the taking, use, or occupation of any land except such as is required for the actual necessary purposes for which the franchise is granted, and that no franchise, privilege, or concession shall be granted to any corporation except under the conditions that it shall be subject to amendment, alteration, or repeal by the Congress of the United States, and that lands or rights of use and occupation of lands thus granted shall revert to the governments by which they were respectively granted upon the termination of the franchises and concessions under which they were granted or upon their revocation or repeal. That all franchises, privileges, or concessions granted under this Act shall forbid the issue of stock or bonds except in exchange for actual cash, or for property at a fair valuation, equal to the par value of the stock or bonds so issued; shall forbid the declaring of stock or bond dividends, and, in the case of public-service corporations, shall provide for the effective regulation of the charges thereof, for the official inspection and regulation of the books and accounts of such corporations, and for the payment of a reasonable percentage of gross earnings into the treasury of the Philippine Islands or of the province or municipality within which such franchises are granted and exercised: *Provided further*, That it shall be unlawful for any corporation organized under this Act, or for any person, company, or corporation receiving any grant, franchise, or concession from the Government of said Islands, to use, employ, or contract for the labor of persons claimed or alleged to be held in involuntary servitude; and any person, company, or corporation so violating the provisions of this Act shall forfeit all quarters, grants, franchises, and concessions for doing business in said Islands, and in addition shall be deemed guilty of an offense, and shall be punished by a fine of not less than ten thousand dollars.

• SEC. 75. That no corporation shall be authorized to conduct the business of buying and selling real estate or be permitted to hold or own real estate except such as may be reasonably necessary to enable it to carry out the purposes for which it is created, and every corporation authorized to engage in agriculture shall by its charter be restricted to the ownership and control of not to exceed one thousand and twenty-four hectares of land; and it shall be unlawful for any member of a corporation engaged in agriculture or mining and for any corporation organized for any purpose except irrigation to be in any wise interested in any other corporation engaged in agriculture or in mining. Corporations, however, may loan funds upon real-estate security and purchase real estate when necessary for the collection of loans, but they shall dispose of real estate so obtained within five years after receiving the title. Corporations not organized

in the Philippine Islands, and doing business therein, shall be bound by the provisions of this section so far as they are applicable.

#### COINAGE.

SEC. 76. That the Government of the Philippine Islands is hereby authorized to establish a mint at the city of Manila, in said Islands, for coinage purposes, and the coins hereinafter authorized may be coined at said mint. And the said Government is hereby authorized to enact laws necessary for such establishment: *Provided*, That the laws of the United States relating to mints and coinage, so far as applicable, are hereby extended to the coinage of said Islands.

SEC. 77. That the Government of the Philippine Islands is authorized to coin, for use in said Islands, a coin of the denomination of fifty centavos and of the weight of one hundred and ninety-two and nine-tenths grains, a coin of the denomination of twenty centavos and of the weight of seventy-seven and sixteen one-hundredths grains, and a coin of the denomination of ten centavos and of the weight of thirty-eight and fifty-eight one-hundredths grains, and the standard of said silver coins shall be such that of one thousand parts by weight nine hundred shall be of pure metal and one hundred of alloy, and the alloy shall be of copper.

SEC. 78. That the subsidiary silver coins authorized by the preceding section shall be coined under the authority of the Government of the Philippine Islands in such amounts as it may determine, with the approval of the Secretary of War of the United States, from silver bullion purchased by said Government, with the approval of the Secretary of War of the United States: *Provided*, That said Government may in addition and in its discretion recoin the Spanish Filipino dollars and subsidiary silver coins issued under the authority of the Spanish Government for use in said Islands into the subsidiary coins provided for in the preceding section at such rate and under such regulations as it may prescribe, and the subsidiary silver coins authorized by this section shall be legal tender in said Islands to the amount of ten dollars.

SEC. 79. That the Government of the Philippine Islands is also authorized to issue minor coins of the denominations of one-half centavo, one centavo, and five centavos, and such minor coins shall be legal tender in said Islands for amounts not exceeding one dollar. The alloy of the five-centavo piece shall be of copper and nickel, to be composed of three-fourths copper and one-fourth nickel. The alloy of the one-centavo and one-half-centavo pieces shall be ninety-five per centum of copper and five per centum of tin and zinc, in such proportions as shall be determined by said Government. The weight of the five-centavo piece shall be seventy-seven and sixteen-hundredths grains troy, and of the one-centavo piece eighty grains troy, and of the one-half-centavo piece forty grains troy.

SEC. 80. That for the purchase of metal for the subsidiary and minor coinage, authorized by the preceding sections, an appropriation may be made by the Government of the Philippine Islands from its current funds, which shall be reimbursed from the coinage under said sections; and the gain or seigniorage arising therefrom shall be paid into the Treasury of said Islands.

SEC. 81. That the subsidiary and minor coinage hereinbefore authorized may be coined at the mint of the Government of the Philippine Islands at Manila, or arrangements may be made by the said Government with the Secretary of the Treasury of the United States for their coinage at any of the mints of the United States, at a charge covering the reasonable cost of the work.

SEC. 82. That the subsidiary and minor coinage hereinbefore authorized shall bear devices and inscriptions to be prescribed by the Government of the Philippine Islands, and such devices and inscriptions shall express the sovereignty of the



United States, that it is a coin of the Philippine Islands, the denomination of the coin, and the year of the coinage.

SEC. 83. That the Government of the Philippine Islands shall have the power to make all necessary appropriations and all proper regulations for the redemption and reissue of worn or defective coins and for carrying out all other provisions of this Act relating to coinage.

SEC. 84. That the laws relating to entry, clearance, and manifests of steamships and other vessels arriving from or going to foreign ports shall apply to voyages each way between the Philippine Islands and the United States and the possessions thereof, and all laws relating to the collection and protection of customs duties not inconsistent with the Act of Congress of March eighth, nineteen hundred and two, "temporarily to provide revenue for the Philippine Islands," shall apply in the case of vessels and goods arriving from said Islands in the United States and its aforesaid possessions.

The laws relating to seamen on foreign voyages shall apply to seamen on vessels going from the United States and its possessions aforesaid to said Islands, the customs officers there being for this purpose substituted for consular officers in foreign ports.

The provisions of chapters six and seven, title forty-eight, Revised Statutes, so far as now in force, and any amendments thereof, shall apply to vessels making voyages either way between ports of the United States or its aforesaid possessions and ports in said Islands; and the provisions of law relating to the public health and quarantine shall apply in the case of all vessels entering a port of the United States or its aforesaid possessions from said Islands, where the customs officers at the port of departure shall perform the duties required by such law of consular officers in foreign ports.

Section three thousand and five, Revised Statutes, as amended, and other existing laws concerning the transit of merchandise through the United States, shall apply to merchandise arriving at any port of the United States destined for any of its insular and continental possessions, or destined from any of them to foreign countries.

Nothing in this Act shall be held to repeal or alter any part of the Act of March eighth, nineteen hundred and two, aforesaid, or to apply to Guam, Tutuila, or Manua, except that section eight of an Act entitled "An Act to revise and amend the tariff laws of the Philippine Archipelago," enacted by the Philippine Commission on the seventeenth of September, nineteen hundred and one, and approved by an Act entitled "An Act temporarily to provide revenues for the Philippine Islands, and for other purposes," approved March eighth, nineteen hundred and two, is hereby amended so as to authorize the Civil Governor thereof in his discretion to establish the equivalent rates of the money in circulation in said Islands with the money of the United States as often as once in ten days.

SEC. 85. That the Treasury of the Philippine Islands and such banking associations in said Islands with a paid-up capital of not less than two million dollars and chartered by the United States or any State thereof as may be designated by the Secretary of War and the Secretary of the Treasury of the United States shall be depositories of public money of the United States, subject to the provisions of existing law governing such depositories in the United States: *Provided*, That the Treasury of the Government of said Islands shall not be required to deposit bonds in the Treasury of the United States, or to give other specific securities for the safe-keeping of public money except as prescribed, in his discretion, by the Secretary of War.

by the Secretary of War, is hereby continued until otherwise provided, and shall be reported to Congress, which hereby reserves the power and authority to annul

the same, and the Philippine Commission is hereby directed to make annual report of all its receipts and expenditures to the Secretary of War.

BUREAU OF INSULAR AFFAIRS.

SEC. 87. That the Division of Insular Affairs of the War Department, organized by the Secretary of War, is hereby continued until otherwise provided, and shall hereafter be known as the Bureau of Insular Affairs of the War Department. The business assigned to said Bureau shall embrace all matters pertaining to civil government in the island possessions of the United States subject to the jurisdiction of the War Department; and the Secretary of War is hereby authorized to detail an officer of the Army whom he may consider especially well qualified, to act under the authority of the Secretary of War as the Chief of said Bureau; and said officer while acting under said detail shall have the rank, pay, and allowances of a colonel.

SEC. 88. That all Acts and parts of Acts inconsistent with this Act are hereby repealed.

Approved, July 1, 1902.

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[PUBLIC—No. 37.]

An Act to promote the efficiency of the Philippine Constabulary, to establish the rank and pay of its commanding officers, and for other purposes.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That officers of the Army of the United States may be detailed for service as Chief and assistant chiefs, the said assistant chiefs not to exceed in number four, of the Philippine Constabulary, and that during the continuance of such details the officer serving as Chief shall have the rank, pay, and allowances of brigadier-general, and the officers serving as assistant chiefs shall have the rank, pay, and allowances of colonel: *Provided*, That the difference between the pay and allowances of brigadier-general and colonel, as herein provided, and the pay and allowances of the officers so detailed in the grades from which they are detailed shall be paid out of the Philippine Treasury.

SEC. 2. That any companies of Philippine Scouts ordered to assist the Philippine Constabulary in the maintenance of order in the Philippine Islands may be placed under the command of officers serving as Chief or assistant chiefs of the Philippine Constabulary, as herein provided: *Provided*, That when the Philippine Scouts shall be ordered to assist the Philippine Constabulary, said scouts shall not at any time be placed under the command of inspectors or other officers of the Constabulary below the grade of assistant chief of Constabulary.

Approved, January 30, 1903.

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[PUBLIC—No. 72.]

An Act to provide for the removal of persons accused of crime to and from the Philippine Islands for trial.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the provisions of section ten hundred and fourteen of the Revised Statutes, so far as applicable, shall apply throughout the United States for the arrest and removal therefrom to the Philippine Islands of any fugitive from justice charged with the commission of any crime or offense against the United States within the Philippine Islands, and shall apply within the Philippine Islands for the arrest and removal therefrom to the United States of any fugitive from justice charged with the commission of any crime or offense

against the United States. Such fugitive may, by any judge or magistrate of the Philippine Islands, and agreeably to the usual mode of process against offenders therein, be arrested and imprisoned, or bailed, as the case may be, pending the issuance of a warrant for his removal to the United States, which warrant it shall be the duty of a judge of the Court of First Instance seasonably to issue, and of the officer or agent of the United States designated for the purpose to execute. Such officer or agent, when engaged in executing such warrant without the Philippine Islands, shall have all the powers of a marshal of the United States so far as such powers are requisite for the prisoner's safe-keeping and the execution of the warrant.

SEC. 2. That the provisions of sections fifty-two hundred and seventy-eight and fifty-two hundred and seventy-nine of the Revised Statutes, so far as applicable, shall apply to the Philippine Islands, which, for the purposes of said sections, shall be deemed a Territory within the meaning thereof.

Approved, February 9, 1903.

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[PUBLIC—No. 137.]

An Act to establish a standard of value and to provide for a coinage system in the Philippine Islands.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the unit of value in the Philippine Islands shall be the gold peso consisting of twelve and nine-tenths grains of gold, nine-tenths fine, said gold peso to become the unit of value when the Government of the Philippine Islands shall have coined and ready for, or in, circulation not less than five million of the silver pesos hereinafter provided for in this Act, and the gold coins of the United States at the rate of one dollar for two pesos hereinafter authorized to be coined shall be legal tender for all debts, public and private, in the Philippine Islands.

SEC. 2. That in addition to the coinage authorized for use in the Philippine Islands by the Act of July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," the Government of the Philippine Islands is authorized to coin to an amount not exceeding seventy-five million pesos, for use in said Islands, a silver coin of the denomination of one peso and of the weight of four hundred and sixteen grains, and the standard of said silver coins shall be such that of one thousand parts, by weight, nine hundred shall be of pure metal and one hundred of alloy, and the alloy shall be of copper.

SEC. 3. That the silver Philippine peso authorized by this Act shall be legal tender in the Philippine Islands for all debts, public and private, unless otherwise specifically provided by contract: *Provided*, That debts contracted prior to the thirty-first day of December, nineteen hundred and three, may be paid in the legal-tender currency of said Islands existing at the time of the making of said contracts, unless otherwise expressly provided by contract.

SEC. 4. That section seventy-seven of the Act of July first, nineteen hundred and two, is hereby amended so that it shall read:

"SEC. 77. That the Government of the Philippine Islands is authorized to coin for use in said Islands a coin of the denomination of fifty centavos and of the weight of two hundred and eight grains, a coin of the denomination of twenty centavos and of the weight of eighty-three and ten one-hundredths grains, and a coin of the denomination of ten centavos and of the weight of forty-one and fifty-five one-hundredths grains; and the standard of said silver coins shall be such

that of one thousand parts, by weight, nine hundred shall be of pure metal and one hundred of alloy, and the alloy shall be of copper."

SEC. 5. That the Philippine peso herein authorized and the subsidiary silver coins authorized by section seventy-seven of the Act of July first, nineteen hundred and two, as amended by the preceding section of this Act, shall be coined under the authority of the Government of the Philippine Islands in such amounts as it may determine, with the approval of the Secretary of War of the United States, except as limited in section two of this Act, from silver bullion purchased by said Government, with the approval of the Secretary of War of the United States: *Provided*, That said Government may, in its discretion, in lieu of the purchase of bullion, recoin any of the silver coins now in or hereafter received by the Treasury of the Government of the Philippine Islands into the coins provided for in this Act or in the Act of July first, nineteen hundred and two, as herein amended, at such rate and under such regulations as it may prescribe; and the subsidiary silver coins authorized by this Act and by the Act of July first, nineteen hundred and two, shall be legal tender in said Islands to the amount of ten dollars.

SEC. 6. That the coinage authorized by this Act shall be subject to the conditions and limitations of the provisions of the Act of July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," except as herein otherwise provided; and the Government of the Philippine Islands may adopt such measures as it may deem proper, not inconsistent with said Act of July first, nineteen hundred and two, to maintain the value of the silver Philippine peso at the rate of one gold peso, and in order to maintain such parity between said silver Philippine pesos and the gold pesos herein provided for, and for no other purpose, may issue temporary certificates of indebtedness, bearing interest at a rate not to exceed four per centum annually, payable at periods of three months or more, but not later than one year from the date of issue, which shall be in the denominations of twenty-five dollars, or fifty pesos, or some multiple of such sum, and shall be redeemable in gold coin of the United States, or in lawful money of said Islands, according to the terms of issue prescribed by the Government of said Islands; but the amount of such certificates outstanding at any one time shall not exceed ten million dollars, or twenty million pesos, and said certificates shall be exempt from the payment of all taxes or duties of the Government of the Philippine Islands, or any local authority therein, or of the Government of the United States, as well as from taxation in any form by or under any State, municipal, or local authority in the United States or the Philippine Islands: *Provided*, That all the proceeds of said certificates shall be used exclusively for the maintenance of said parity, as herein provided, and for no other purpose, except that a sum not exceeding three million dollars at any one time may be used as a continuing credit for the purchase of silver bullion in execution of the provisions of this Act.

SEC. 7. That the Mexican silver dollar now in use in the Philippine Islands and the silver coins heretofore issued by the Spanish Government for use in said Islands shall be receivable for public dues at a rate to be fixed from time to time by the proclamation of the Civil Governor of said Islands until such date, not earlier than the first day of January, nineteen hundred and four, as may be fixed by public proclamation of said Civil Governor, when such coins shall cease to be so receivable: *Provided*, That the public offices of the Government of said Islands shall give a preference for all public dues to the silver pesos and the silver certificates authorized by this Act, and may at any time refuse to receive

such Mexican dollars and Spanish coins as may appear to be counterfeit or defective.

SEC. 8. That the Treasurer of the Philippine Islands is hereby authorized, in his discretion, to receive deposits of the standard silver coins of one peso authorized by this Act to be coined, at the Treasury of the Government of said Islands or any of its branches, in sums of not less than twenty pesos, and to issue silver certificates therefor in denominations of not less than two nor more than ten pesos, and coin so deposited shall be retained in the Treasury and held for the payment of such certificates on demand, and used for no other purpose. Such certificates shall be receivable for customs, taxes, and for all public dues in the Philippine Islands, and when so received may be reissued, and when held by any banking association in said Islands may be counted as a part of its lawful reserve.

SEC. 9. That for the purchase of metal for the silver Philippine peso authorized by this Act, an appropriation may be made by the Government of the Philippine Islands from its current funds, or as hereinbefore authorized, which shall be reimbursed from the coinage under said sections.

SEC. 10. That the silver Philippine pesos hereinbefore authorized may be coined at the mint of the Government of the Philippine Islands at Manila, or arrangements may be made by the said Government with the Secretary of the Treasury of the United States for their coinage or any portion thereof at any of the mints of the United States, at a charge covering the reasonable cost of the work.

SEC. 11. That the silver Philippine peso hereinbefore authorized shall bear devices and inscriptions to be prescribed by the Government of the Philippine Islands, and such devices and inscriptions shall express the sovereignty of the United States, that it is a coin of the Philippine Islands, the denomination of the coin, and the year of the coinage.

SEC. 12. That the Secretary of the Treasury is hereby authorized and directed, when requested by the Government of the Philippine Islands, to cause to be made and prepared any drawings, designs, and plates, and execute any coinage, engraving, or printing of notes and certificates authorized by this Act, and to make a proper charge for the same, covering as nearly as may be the actual cost, which shall be defrayed from the revenues of said Islands.

SEC. 13. That section seventy-eight of the Act of July first, nineteen hundred and two, and all Acts and parts of Acts inconsistent with the provisions of this Act, and all provisions of law in force in the Philippine Islands making any form of money legal tender after December thirty-first, nineteen hundred and three, except as provided in this Act, are hereby repealed.

Approved, March 2, 1903.

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